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NATURAL HISTORY



BIRD NUMBER

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THE JOURNAL OF THE AMERICAN MUSEUM

DEVOTED TO NATURAL HISTORY,
EXPLORATION, AND THE DEVELOP-
MENT OF PUBLIC EDUCATION
THROUGH THE MUSEUM



BIRD NUMBER

FRANK M. CHAPMAN, EDITOR

SEPTEMBER-OCTOBER, 1925

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NATURAL HISTORY

VOLUME XXV CONTENTS FOR SEPTEMBER-OCTOBER NUMBER 5

Cover Design, Wild Geese.....	F. L. JAUQUES	
Frontispiece in Color, The Pink-headed Duck of India.....	Facing	431
From a painting by F. L. Jaques of the American Museum		
Equatorial Vignettes.....	ROBERT CUSHMAN MURPHY	431
Impressions of the coasts of Peru and Ecuador, 1925		
The Summer Birds of Northern New Jersey... ..	WALDRON DE W. MILLER	450
With special reference to the presence in this region of Canadian zone species. With a colored plate by Bruce Horsfall		
The Crowned Eagle, Ogre of Africa's Monkeys.....	JAMES P. CHAPIN	459
An account of the difficulties encountered by collectors in their efforts to observe and capture a rare bird of prey		
Bird-hunting in Central Park.....	LUDLOW GRISCOM	470
Practical information about local and migratory birds which will prove helpful to the amateur ornithologist		
The European Starling as an American Citizen.....	FRANK M. CHAPMAN	480
The advent, spread, and present economic status in this country of a European immigrant. With a colored plate by Allan Brooks		
The Epstein Panel in the Hyde Park Bird Sanctuary.....		486
With a picture of the panel and comments by the Editor and others as to its fitness as a memorial to the great nature lover		
The Roosevelt Memorial Bird Fountain.....		487
Illustration of the Memorial to be placed at Oyster Bay by the National Association of Audubon Societies		
Meetings of Ornithological Societies in the American Museum.....		488
Coming events of national and local ornithological import		
Reports from the Field.....		491
News from expeditions now or recently at work in the the South Seas, Panama, South America, and Africa		
News from the Study.....		498
A report of departmental activities—collections, exhibition, routine, and research		
Birds in Books.....		508
Reviews of recent books published in America and England, as well as of popular bird magazines		
From Other Museums.....		516
The ornithological activities of other museums in this country		
Notes.....		522

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PINK-HEADED DUCKS
Male (left) and female
Gift of the Faunthorpe-Vernay Expedition

NATURAL HISTORY

VOLUME XXV

SEPTEMBER-OCTOBER

NUMBER 5

Equatorial Vignettes

IMPRESSIONS OF THE COASTS OF PERU AND ECUADOR, 1925¹

By ROBERT CUSHMAN MURPHY

Associate Curator

I. EL NIÑO

IN early January the weather and the ocean along the coast of Peru had all the characteristics which an experienced seafarer would have expected. Sunshine, wind and water, clouds and temperature, all were seasonable; all, indeed, were probably very much as they have been during the greater part of time which has no record in human history and which goes back ages before the Spaniards or the builders of Pachacamac.

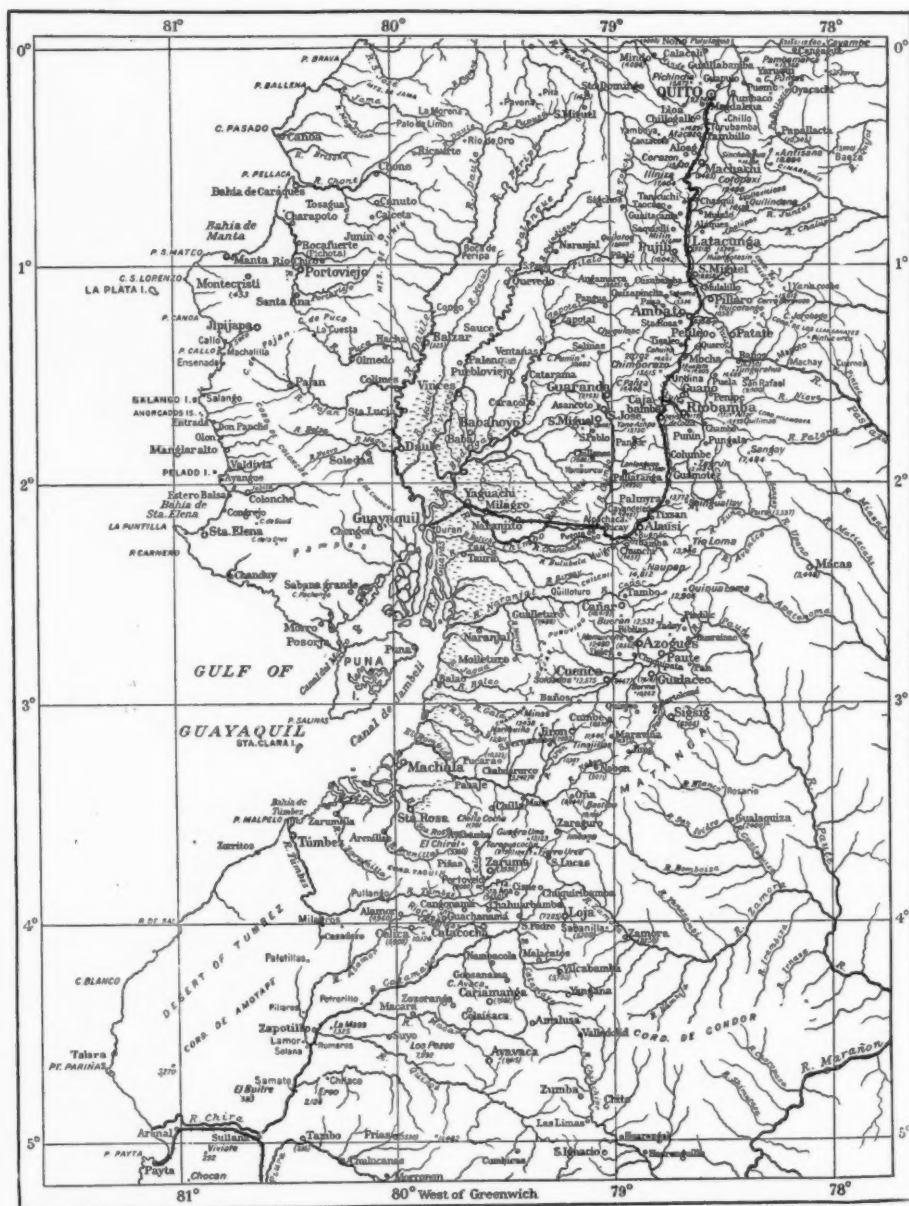
The breezes came steadily, sometimes briskly, from the southward, and thick mists veiled the windward headlands of high islands. The cool waters of the Humboldt Current rolled along their wonted, leisurely course toward the Line. The Pacific was here and there reddened by acres of living jelly, or streaked with a Milky Way of swimming crablets perhaps no less numerous than the stars. And the unbelievable flocks of guano birds, always the same yet never monotonous, spread out over the coastal ocean and gorged upon its harvest. For five days I skirted the long shore from Mollendo to Point Pariñas, while every sign held. If the Inca Sun God had walked as a cosmic watchman along the wall of the cordillera, he would have cried each hour, "All's well"!

On January 17, when we began our marine work at Talara, six miles north of Point Pariñas, the weather

was only slightly less equable. Here there had been experienced during the preceding week brief spells of northeasterly winds, with uncomfortable increases in heat and humidity; but so near the equator such vagaries are not considered remarkable at the New Year season. At any rate, when we first put out to sea, the environment was in all respects substantially normal for the month and the latitude. Southerly winds, with the usual diurnal swing and cycle of velocities, still prevailed; the ocean waters along the northerly border of the Humboldt Current were of temperatures close to 65° F., with higher ranges offshore; and all the species of guano birds, except the Peruvian pelican, had worked northward to Point Pariñas, the westernmost projection of the continent, or had rounded this frontier mark to feed along the coast toward Cape Blanco. Except for the abundance of man-o'-war birds, the bird life off Talara was, in fact, not very different from what one would encounter south of the Lobos Islands.

By January 19, familiar weather conditions had altered more definitely; the wind was blowing from the west, and the cessation of upwelling of water from deeper and cooler layers of the ocean, together with the inward drift of warm water from offshore, were reflected in higher surface temperatures, which averaged above 72° F. through-

¹The author, together with Mr. Van Campen Heilner, conducted field work in Ecuador and northern Peru during a winter which proved highly exceptional from a meteorological point of view.



Southwestern Ecuador and northwestern Peru.—From the American Museum's map of Ecuador and contiguous regions

out a wide expanse off Talara and the coast to northward. A great flock of guanayes, or Peruvian white-breasted cormorants, guano birds peculiar to the cool waters of the Humboldt Current, and which are, indeed, a visual index of its extent, was observed off

Point Pariñas, where large numbers of the birds spent the night on the rocky shore. With the advent of unfavorable circumstances, however, they all moved off to southward on the morning of January 20, and, except for a few individuals, some of which were sick,



Point Pariñas, the western extremity of the South American continent, with oil derricks close to the surf

no more appeared in these latitudes through the winter. The reactions of the guanayes were doubtless more delicate than any human premonitions. Their departure, as we later realized, coincided with the beginning of a change of such magnitude that it occurs but once in a generation, a change which endured from that date until the end of May, and which had a profound, even though temporary, effect upon the whole climatic character of the Peruvian seaboard.

By this time it was evident to local mariners and fishermen that *El Niño* was flowing—*El Niño*, "The Child," even though Christmas was nearly a month behind us—*El Niño*, the warm current from the north, which rarely keeps its seasonal appointment precisely, but which may come at any time between December and April, and occasionally at other periods of the year. Its arrival is usually associated with northerly winds, and when it has raised the temperature of the surface waters until they are warmer than the air, rain is likely to follow along the desert coast. Moreover, its warmth brings sickness and death to the population of the Humboldt Current, beginning with the annihilation of vast

numbers of microscopic organisms which cannot endure the rapid heating of the sea, and culminating in the destruction of such guano birds as fail to retreat to safer regions down the coast.

On January 20 the fickle winds were back in a southerly quarter, but the prodigious oceanic movement which had set in was not to be stemmed by any transitory counter breeze. *El Niño* was running southward past Cape Blanco, past Point Pariñas, and the temperatures of the ocean for a distance of twelve miles from shore averaged above 76° F. Now we encountered the first flying fish, which are always common in the outlying tropical waters but which are rarely or never seen close along the Peruvian coast while the Humboldt Current prevails. On the same day, too, the hammer-head sharks appeared in exceptional abundance. Five miles from the beach we entered a zone which seemed to be filled with them, for thousands upon thousands crossed our course. Their line of march was perhaps two miles broad and of indefinite length, for we cut through it at widely separated points when outward bound and upon our return to port. Scores of fins were visible at a glance, the whole legion



A guanay, separated from its flock, which rested on the "Silver Spray" off northern Peru. The visitor remained six hours, seemed to enjoy being caressed, and playfully bit the fingers of its human hosts

moving down the wind, or against the current, the fishes paying little attention to the launch until it was upon them. Finally, on this same afternoon, we met with sea birds from the more northerly ocean—species rare in these waters or even, so far as the records go, new to the Peruvian coast.

On January 21 we put our scales upon El Niño. At noon we anchored the 86-foot launch "Chiralite," courteously supplied by the International Petroleum Company, in nine fathoms of water a mile west of Point Paríñas, well clear of any coastal influence upon the oceanic circulation. A fresh breeze from west of south covered the Pacific with whitecaps. To our surprise the vessel immediately began to swing about before the strong current from

the north, and within a few minutes she was resting with her stern directly against the wind. At the same moment we noticed a group of laughing gulls sitting on the water offshore, and, as we watched them, they too drifted southward into the breeze. It seemed remarkable that the current should have more power than the wind upon the light-bodied birds.

As soon as our craft had steadied to thirty fathoms of cable, we put into operation the current-recording log line, and made ten readings during the course of an hour, which showed a southward flow of the water ranging in rate between one and one and one-quarter knots. Following these measurements, we weighed anchor and headed due westward to a position nineteen miles

from the Point. The southerly wind increased slightly in strength during the afternoon, but by the bearing of Pariñas Light we were able to determine that the launch was being deflected to southward by a current approximately the force of that at the anchorage. The same procedure was followed and the same effects observed on the return trip, and the continuous records of more than ten hours prevented the confusion of possible tidal movements with those of a demonstration of El Niño. The action of the wind, whatever it may have been, was obviously against that of the current.

How can I picture the dramatic accompaniments of such a great reversal of generally stable oceanic conditions as we so fortunately witnessed off the oil fields of Pariñas? The first, amazing enough to one who has been afloat for weeks at a time in the phenomenally cool and little-varying waters which bathe the sunburnt shores of Peru, was the rise in ocean temperature, amounting to an increase of 10° F. within forty-eight hours, and a subsequent rise of at least six degrees more which endured throughout the remainder of the winter. No less remarkable, particularly in central and southern Peru, was the replacement of the reliable southerly winds, upon which seafarers have banked from immemorial time, by fitful and yet recurrent rain-bearing winds from the north. And finally, most impressive of all, were the changes in the oceanic life which no naturalist could overlook—the immigrating cohorts of hammer-heads, the jumping mantas or giant rays, the schools of large flying fish pursued by equally alien tropical dolphins, and the presence far down the coast of such novel birds as migrant laughing gulls and royal terns from North America,

and of Ecuadorean white boobies and tropic birds from the island of La Plata.

From the middle of January gossip at the Talara club house related chiefly to the weather. The counter-current was scarcely above the commonplace, for El Niño was expected to make at least a brief visit almost every year. But the breathless days, and the gathering of clouds, dark as volcanic smoke, above the Amotape Mountains, turned back men's thoughts to greater rhythms of time. Engineers who had been long in the petroleum service spoke vaguely of the wet, seventh year. Weather-beaten skippers and port masters, who had spent most of their lives on the West Coast, turned back their memories still farther, and talked about the season of 1891—of deluges, lightning and thunder, and other impossible things, of the washing away of buildings and oil derricks, of the cutting out of new rivers, and of the *año de abundancia* which followed, when cotton crops were grown on the bare desert.

The first spatter of rain at Talara occurred on the evening of January 19, after the wind had switched to east of north, parallel with the main trend of the coast line from the Gulf of Guayaquil. For a week it had been raining in the Amotapes, fifteen miles inland, and the pall of stormy clouds had worked down the Pariñas and Máncora valleys toward the sea. The upper trails were already flooded, and by January 25 water had reached the Pacific through *quebradas*, blocking the road between Talara and Lobitos, and limiting transportation to the sea route.

What followed is now history. The real rains began at Talara about daybreak of January 27, before a northerly wind, the fall continuing until nearly noon, and then resuming at sunset. The baked soil became a horrible,

gluey mess, and large ponds rapidly accumulated. Then, southward along the flat shores and the arid slopes of the Andes, the precipitation followed in the wake of El Niño to unheard-of latitudes, until cities and haciendas which are content with their normal abundance of river water became glutted and laid waste with the excess. The mountain railroads were swept into the gullies, and the bridges carried away. Ocean temperatures rose to 79° F. at Molendo, and to 70° F. at Antofogasta. The Indian fishermen found their livelihood gone. Dead fish, mingled with untold numbers of birds, strewed the tide lines for hundreds of miles as the ocean turned sour, and thirty-five thousand tons of new guano were washed from the islands by falling water. The northern coves became choked with flotsam from engorged stream beds, and sea snakes, alligators, and strange lizards were cast upon unfamiliar strands. Mulletts came out of the ocean to swim about in the squares and roadways of the petroleum towns, and, when the rains began to diminish, mosquitoes, and the *caballitos del diablo* or dragon flies which prey upon them, were engendered in such swarms as had never been known.

All of this, however, is ahead of my story. What I saw of the great rains and their results was reserved for a second visit to northern Peru, in March. When we sailed from Talara in the "Silver Spray" on the evening of January 27, rain was falling, and all night it pattered on the shelter above the afterdeck. But next morning we knew that the deluge had not quite come, for the sky over the Pacific was clearing, and a sunrise of pure gold was breaking above a gray cloud bank beyond the northern Amotapes.

II. THE MOUTH OF THE CHIRA

The Chira comes down behind the Amotape Mountains, turns westward at the southern end of the range, and weaves a broad green ribbon through the desert. Upstream, fine haciendas draw upon its muddy waters; nearer the mouth the banks are swamp and jungle, bordered in places by groves of large and evenly spaced algaroba trees which spread back across the flood plain to the edge of the valley.

When the river approaches the sand dunes of the shore, it breaks into streamlets like the veins of a leaf. Each little capillary shoals rapidly, seeming to climb with effort over the



Crossing sand dunes on the way to the Chira
Photograph by Van Campen Heilner

crest of the beach before it tumbles down a pebbled sluiceway into the surf of the Pacific.

A feeble rivulet is the Chira in the eyes of the horseman who crosses its bubbling outlets without a thought of danger. Yet it is, after all, more mighty in effect than many a prouder stream. The only through-flowing river in the northerly Peruvian desert, it supports the agriculture of a populous and historic valley, while its trickling waters give to the ocean mysterious nutriment which enables marine life about its mouth to develop with a richness noteworthy even in the richest of seas. It is as though the river were a gland in the physiological make-up of the coastal Pacific; all the teeming chemicals and foodstuffs of the ocean avail nothing until life is quickened by enzymes from the water of soil and melted snows.

We reached the mouth of the Chira in a Ford on the morning of January 24. The name of the motor car should, perhaps, be qualified by adding that it had been rebuilt to pioneering specifications in the shops of the International Petroleum Company at Negritos. Its body was a buckboard, covered with a tropical top of white canvas; a windshield it had never had; the springs and axles were wound with twisted rope snubbers; and each tire was covered with an extra shoe, which not only gave security against punctures but also furnished a broad tread for running upon sand. Equipped with a fleet of such conveyances, the oil engineers wander merrily over the pathless desert, climbing the dunes to gain the hard highway of the beach, or wriggling up the arroyos of the Amotapes into places where most travelers would hesitate to ride a horse.

The one rule of the road, as we

learned on the way to the Chira, is to keep going at all costs. With headway you may surmount anything; if you stop, you will sink to your hubs and remain. So across the crusty tops of natural salt pans, through caravans of frightened and scattering burros, or among hummocks and windrows of the back-beach, our host pressed the accelerator and jerked the double-sized steering wheel until we all but hurdled obstructions. Two or three times we had to unload our duffle, build a short corduroy road of driftwood, and apply our shoulders, until we had crossed the last dune and skirted the last lagoon to the firm strand of low-tide zone. Then came the flying stretch to the Chira, with millions of red crabs dodging first one way and then the other in front of us. Far, far ahead, the crabs, which seem always to be scudding, looked like spindrift from the breaking waves, but when the strange, roaring devil bore upon them, their frantic and indecisive reversals made one fairly dizzy.

Near the northern mouth of the Chira, bands of naked Indians were hauling their seines in pockets of the beach. A hundred yards upstream we met others carrying casting nets along the banks and upon the exposed bars—splendid, bronze, broad-chested men from Vichayal or sunny Colán, going about their business with all the incurious dignity which seems to be characteristic of primitive toilers. The fish that they were taking, in the terminal pools of the river, were of such salt-water sorts as flounders and mullets, and the explanation of their presence in the fresh water came unasked, for of a sudden the Pacific breathed a deeper, ninth-wave swell, and a seething layer of brine slid up against the outgoing stream, over the wave-built barrier, and on and on until

*Photograph by Van Campen Heilner**Atarrayas, or casting nets, in action*

it disappeared among reedy channels. Forty minutes later a second wave followed the first, and the line of demarcation between river and ocean was soon lost. Such tiny tidal bores had but a four-inch front, but they were, none the less, expressions of a movement which goes around the world.

On the sand bars of the Chira, or floating upon the surface of the diffuse streams among which we stopped, was an assemblage of birds the sight of

which paid well for the exertions of the journey. Brown pelicans, the identical species of Florida shores, were packed shoulder to shoulder near the middle of little islands, while black cormorants, with wings spread to the morning sun, stood in single rows along the river's brim. Both pelicans and cormorants were evidently resting, perchance waiting for the tide to lure new schools of mullets into the estuary. A stone's throw across a branch of the river were

*Photograph by Van Campen Heilner**Indian fishermen on a sand bar of the Chira*

a hundred or more egrets, with plumes at the peak of luxury, and near by, partly mingling with them, half their number of roseate spoonbills. As we walked over a steep-shored rise of the bank, we came upon four of the latter exquisitely colored waders feeding at the margin of the shallow water only a few paces away. Our presence caused no interruption in the snapping of their double spades, and we watched, spell-bound. A wrinkled, white-haired fisherman, observing that one of us carried a gun, and not appreciating that at the moment our interest was prompted by admiration and sheer delight, whistled through his teeth to attract our attention and, while he coiled his net for a cast, called significantly that the *cuchareta* (which also means spoonbill) is "very rich eating, like a pullet."

On flats beyond the egrets and their rosy companions we saw clusters of wood ibises, many standing with legs in a figure four. Upstream, against a background of green vegetation, were more of these great white, black-headed, black-legged creatures which, despite the inconsequential fact that they are storks rather than true ibises, can hardly fail to conjure up an image of what the Nile ought to be like. When a flock in Indian file flew close overhead with stately wing-beats, it created in my imagination the latest of many resemblances between the old empires of the Incas and the Pharaohs.

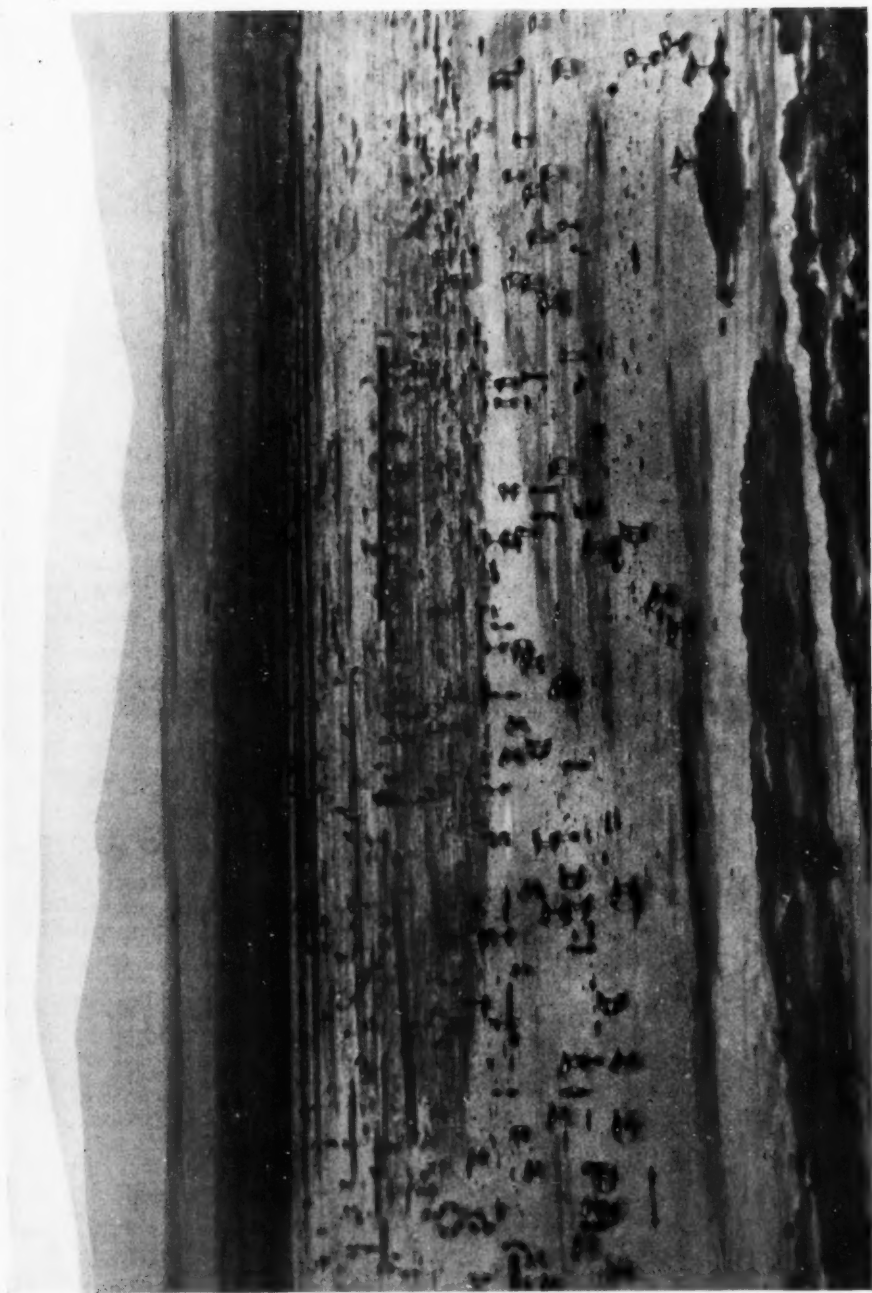
For a time the striking and somewhat unfamiliar marsh fowl absorbed us to the exclusion of other observations, but as soon as we were in a mood to make a complete census of the visible bird life, it was quickly impressed upon me that the mouth of the little river beside which we stood was near the corner post of four great realms of life—two of the land and two of the



A *piquero*, or Peruvian gannet (*Sula variegata*), the northernmost breeding grounds of which are on cliffs near Talara

sea. Over the Pacific, in plain view, were groups of various guano birds, which go northward but a few miles beyond the Chira, and which are attracted by banquets due in part to precious compounds poured out of its horn of plenty. Among these sea birds was the huge pelican of the Humboldt Current, which here meets the West Indian pelican at the southern limit of its range, but which, unlike the latter, clings exclusively to the salt sea. Here, too, the Peruvian and the blue-footed gannets, birds which mingle throughout a broader belt of latitude than the pelicans, were in the air together.

Spotted sandpipers, an osprey, laughing gulls, and royal terns from North America; tropical man-o'-war birds, the range of which is one with that of the brown pelican; both the black and the turkey vulture; a condor soaring over the yellow upland beyond the vegetation of the river valley; kelp gulls flying in from the Pacific and up



NORTH AMERICAN MIGRANT SHORE BIRDS IN A PERUVIAN COASTAL LAGOON

Most of the birds shown in the photograph are semipalmated sandpipers (*Ereunetes pusillus*) and western sandpipers (*Ereunetes mauri*)

the Chira on their maraudings—all these, and more, we could see by merely turning on our heels. Years before I had found the nests of the kelp gulls in the snow, beside the bleak borders of antarctic glaciers. How strange it now was to watch one of the oceanic freebooters alight beside a wraithlike egret on the mud of an equatorial river!

The contrasts might be continued, for scarcely less startling was the meeting of brown pelican with Andean condor, or that of Peruvian booby with roseate spoonbill. Nor did the birds which we saw complete the picture entirely, for up the valley of the Chira, so near that we might almost have heard the songs and bell-like calls, we knew that the musical *chalala* or ovenbird (*Furnarius*) was building its adobe nest in the great algarobas, and that parakeets, woodhewers, and green and azure jays came down in thickets of the river border that led back through mountain passes and, ultimately, to forests of the Amazon. Here we were as close as one can come to the magical contact of desert and jungle, to the junction of the warm ocean water with the cold.

Before noon we left the mouth of the Chira, just in time to prevent the flooding tide from imprisoning us on the beach. Had the Indians, who signalled farewell with a single gesture while they busily flung and drew their nets, been watching the dark clouds above the Amotapes, and had they sensed the portent? Or did they realize no more than the birds that a few weeks later the now gentle river would rise as it had not for a lifetime, swelling until its torrent gouged anew into the old cutbanks of the desert, battering down the wide dam of the beach, and carrying crops, trees, cattle, and buildings, all swirling into the Pacific?

III. THE GUAYAS

The Guayas is a small mark on a map of the Americas, yet it is the greatest river of Pacific drainage between the Colorado and Cape Horn. On the narrow western watershed of the Andes it is a sort of counterpart in miniature of its big transmontane neighbor which carries, it is said, one-fifth of all the running water in the world. As the Amazon and its tributaries spread a network throughout the grandest of alluvial basins, so the system of the Guayas deploys on the shorter slope of western Ecuador, and few hamlets in the lowlands are remote from waterways navigable for launches and barges. If, for example, a steamer is lacking to carry you from Guayaquil to the coast of Manabí, you have the choice of an inland passage up the Daule and the Puca, or some other branch, then taking a short land trip which will bring you to backwaters of the western coast. By this route the mail is not infrequently transported.

When you first enter the Guayas by ocean-going steamship, the river is sure to seem impressive beyond expectation. A vast volume of water evidently flows in the wide channel between the corridors of forest or the low-lying savannahs on either hand; the floating tree trunks and the numberless rafts of water hyacinths and other green plants, which rush down toward the Gulf only to return with the incoming tide, help further to invest the stream with the appearance of a main artery of the continental tropics. And when, after thirty or more miles of wilderness, you approach the long and bustling waterfront of Guayaquil, with ten-thousand-ton ships at anchor and the dwellings of Las Peñas and Santa Ana piling up above the business structures of the Male-

cón, you can look on up the still broad belt of shining water and almost believe it as endless as the Mississippi.

It was in the blackness of early morning that I arrived at the mouth of the Guayas after an absence of five years. Rain was falling thickly but softly—without being torrential, it was peculiarly soaking. The "Silver Spray's" whistle shrieked, her engines slowed and stopped, her head swung toward the lighthouse and the luxuriant woodlands of Puná Island.

As darkness began to fade, the river turned milky yellow. Leaden clouds, with every indescribable wash of silver and gray, closed in the whole horizon. Islets appeared in the scene much as images burst into view during the development of a photographic plate. The low mangroves on bars and spits loomed up like tall trees, each with its magnified reflection. Pointed canoes, which had begun to sally forth from misty shores, also were enlarged and lifted into the air by the peculiar light.

Other vessels were waiting with us for their respective customs guards from Puná; a native sloop or two, the crews asleep; a quaint, brightly painted little river steamer from Santa Rosa, with women passengers gazing wearily out of the ports as they rested on their arms; and, downstream, a diminutive green fisherman of Yankee rig, which proved to be the "Sea Lion," just from San Francisco.

The east now brightened quickly, and wonderful blue mountains in the direction of Cuenca reared above the lower layers of cloud. Man-o'-war birds, blue-footed gannets, pelicans, herons, and laughing gulls dotted the sky, and black skimmers plowed along the tidal rips. *El arador*, the plowman, they call this bird in Ecuador, with an imagery better than our

own. It seemed to us in the early light that extraordinary numbers of humming birds were likewise darting about above the river, but they soon resolved themselves into powerfully flying crickets of a kind all too well known at certain seasons in Guayaquil.

The impatient whistling of the "Silver Spray" at length produced the desired result; our guard came out from Puná before the sun was in sight, a dark little man under a dripping umbrella, without a collar, but tenderly perfumed. His duty was doubtless to see that no smuggling took place during the journey up the Guayas, but, once aboard, he passed into a slumber resembling aestivation, reviving only at meal times until we anchored in the rushing current off our destination.

The rainy season was in full swing at Guayaquil, and the city was a steam bath. About half past five of every afternoon the skies opened and the rain dropped straight down, with no breath of air to impart an angle. Even if a gale had been blowing, the stirring atmosphere could hardly have penetrated the fine screening of the hotel bedrooms and the close bar of netting which one tucked carefully around the mattress. All night the unvarying downpour continued, the streets disappearing under a welter of water in which giant toads barked. About dawn, however, the rain ceased, and the dull canopy was soon more or less broken up by the sun which, before noon, shone with a blasting glare. But always certain woolly masses of cloud remained, endowing the Guayas with a mirror-like sheen, and seeming to press low upon the perspiring earth. It was pleasant, at least, to listen to tales of the dry season, when the air is relatively bracing and when, on rare occasions, the snow-capped pile of

Chimborazo, rising above the emerald hill at Durán, can be seen in full glory from the Malecón.

Guayaquil is an inland seaport, and its life centers about the river front. Merchants look to the daily printing of the schedule of steamers, many of which come and go with exasperating irregularity, but which, nevertheless, connect the country with all the earth. Humbler trade of great volume is carried on in coastal sailing craft from the north and the south, queer *balandras* of sloop or schooner rig, rough-planked, high-sided, clumsy, but bearing evidences of having been furbished at least once in their lives with the most brilliant of pigments. Some of them display painted ports, and look as though they might be as bristling with hidden cannon as a Lascar pirate.

Still stranger hulls occasionally come in from the Pacific—balsas from Sechura, bringing fish, and working up the Guayas in six-hour, flood-tide stages which, if luck is poor, may last ten painful days. Once we passed a balsa inbound along Puná, a weird, junklike raft, with an elongate square sail, moving with majestic slowness before the wind. It was made of nine enormous logs, and on the crudest of masts the sail hung from a long, bowed yard. Seven Indians were visible on board, and others may have been sleeping in a canvas tent which occupied a raised platform of smaller logs. Toward the bow, if either extremity deserved the name, two men were cooking over an open fire on a hearth of stones. The bold and ingenious mariners had been, perhaps, for weeks on the high sea, curing their fish on an open raft through which the water swished with every swell!

From upstream, under power of sweep and paddle, the food of Guaya-

quil comes to the steps of the river-side market. It is interesting to see that the iron lighters are exact replicas in form of the slender, spoon-ended canoes



Photograph by Dr. Herman C. Parker
A balandra on the Guayas

which lend so much charm to all quiet waterways—the canoes which the marsh birds and the alligators completely disregard, although they are quick to seek concealment at the approach of a white man's launch. In such bottoms come the cacao, the bananas, the papayas, and a thousand other products of the tropics, to port.

In the colorful market, heaps of fruits, fish, and fowl, and the handicraft of the country are mingled indiscriminately. Mussels and mangrove oysters lie beside the pitiful, plucked carcasses of purple gallinules. Here a basket of luscious avocado pears, there a pile of glistening catfish, or of the slimy *boca*



A balsa from Peru, bound toward Guayaquil

chica, the name of which wakes you at dawn as the hawkers sing it mournfully through the streets of Guayaquil. On the next table, perhaps, are tiers of pale, uncanny land crabs, held together in geometric masses by a sort of master string. Grotesque toucans with clipped quills hop about over the sacks and stalls, and parakeets chatter from overcrowded splint cages.

Of the birds which live in the environs of Guayaquil, we saw during our brief stay chiefly those of the river and its sloughs. About the slaughter house the vultures and the man-o'-war birds make an amicable division of the spoils, the former taking whatever is cast on shore, the others swooping upon all that floats in the stream. Across the river, in full view of the docks, wood ibises and a multitude of shore birds feed on the flats at low tide, and in all wet meadows flocks of jacanas flash their pea-green wings. Martins and other insect-hunters fly in the main thoroughfares, but the most attractive of all the urban residents are the vermilion flycatchers. These feed in part upon great dragon flies, which they capture not by speed but by stealth. With the setting of the sun the dragon flies become lethargic and rest on telephone wires; then the gorgeous flycatcher and his mate, which look the same color in the evening light, scout silently along the wires and pick off the hapless insects without the necessity of a chase. It is amazing to see them swallow creatures almost as large as themselves, crunching back the four hard wings as they gulp them down. Thus might a modern Sinbad picture the roc devouring airplanes.

All journeys in the tropics have a way of starting either after dark or before daylight. In keeping with the custom, we boarded the launch "Cypress" on the evening of February 10, and chugged away toward Salinas with the beginning of the ebb. The small vessel swarmed with people—Ecuadoreans, Jamaican negroes, Germans, and gringos—who occupied nearly every foot of the deck, and the interstices between the human passengers were filled with chickens, turkeys, dogs, and cats.

For once, in place of the usual

evening rain, stars were shining above the Guayas, but lightning was flashing upstream and over the hill at Durán. We glided past the long liners just as they were commencing to swing their sterns toward the sea. Guayaquil looked black and half submerged, the only lights high above water level being those of Las Peñas, and these soon shone very faintly. The heavy air was stifling, and it was horribly hot in the two-berth cabin which three of us were fortunate to share while most of our shipmates sprawled upon the luggage that covered the forward deck. When we had decided on the disposal of our accommodations for the first half of the night, I stretched out in the upper berth with the sweat oozing from every pore and yet my stomach cold with the unaccountable tropical chill. The paradoxical heat and shivering, and the thirst, which flat, boiled water could not satisfy, put sleep out of the question, so I lay watching floating islands and bushy banks seem to slip back past the still river until, at the end of the Morro Channel, the longed-for fanning of sea air brought oblivion.

IV. SANTA ELENA

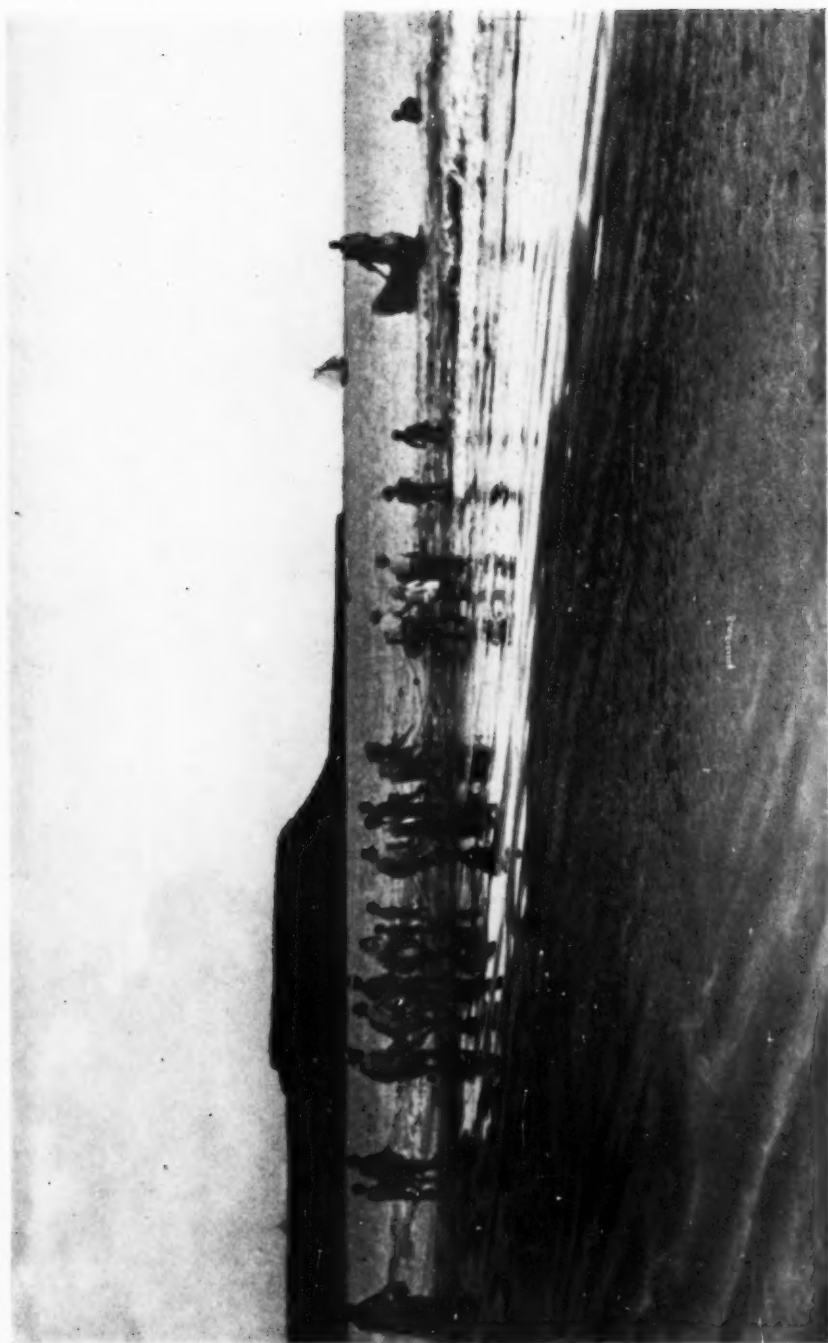
Westward over the Andes from rain forests of the Oriente, the territory of southern Ecuador first shares two alternating seasons, wet and dry, which in the extreme west give way to a climate only slightly less arid than that of the not distant Peruvian desert. The peninsula of Santa Elena, and the coast which stretches straight northward, lie partly in the zone of long droughts; farther south, the boundary of this zone bends eastward into the funnel-shaped Gulf of Guayaquil to strike the Peruvian shores near Tumbes. From some undetermined point at the northern end of the Amotape

range we can draw a line across country to the delta of the Tumbes River, thence by a water loop between the islands of Puná and Santa Clara (which are but eleven miles apart), and, finally, across the base of Santa Elena and northward close to the ocean toward Cape San Lorenzo. East of this line there is an annual rainy season; west of it rain falls in appreciable quantity only at intervals of years.

The meteorological frontier is very exact, however imperfectly its course has yet been traced, for on the coast between Santa Elena and San Lorenzo are communities, separated only a mile or two, in which the respective climatic distinctions hold. Moreover, the animal life reflects the differences, and the plants still more so. To select but one subtle example among the birds, we may note that the race of turkey vulture which inhabits the far-away Falkland Islands, and the coasts of Chile and Peru, extends northward west of the rain line as far as La Plata Island, while east of the line, in the region of yearly precipitation, it is replaced by a distinct form of turkey vulture which comes down to the mouth of the Guayas from humid forests of northern Ecuador and Colombia.

Regarding the interval of the rainfall cycle on the semi-arid portions of the mainland, and the outlying islands, opinion differs. It is commonly spoken of in the country as a seven-year period, but it may sometimes be a little shorter or a little longer. In any event, we came to Santa Elena on February 11 and found the rains in progress.

At three o'clock in the morning, long after the appointed hour, I suddenly awoke in my berth on the "Cypress" and hastened to the open afterdeck, where my companion lay asleep in a steamer chair with the rain pounding



Photograph by Van Campen Heilner

HAULING THE SEINE AT SALINAS

Just outside the gentle swell is the bongo used as a net boat, and in the background are the lighthouse and the Punta of Santa Elena

on his oilskins. Several corpse-like figures, wrapped in thoroughly drenched white sheets, were slumbering round about. A young German, wearing a starched collar, a serge suit, and a stiff straw hat, was sitting with no protection whatsoever and puffing a cigar as nonchalantly as though, as the old song has it,

'Twas off the blue Canary Isles, one
glorious summer day—

I took my turn in the steamer chair, swaddled in a large poncho, and felt the cool water sliding down the outside while I remained perfectly dry. The "Cypress" was rolling terrifically in the notorious broadside swells of Chanduy, with nothing this side of the South Pole to break the onshore wind and seas.

When I awoke again, it was light enough to reveal porpoises racing the launch, and many sea birds, including a great flock of small fluttering terns which annoyed me in a manner that only a naturalist can fully appreciate—I could not identify them in the air, and there was no possibility of shooting and recovering a specimen.

About nine o'clock, with slopping decks, and the cases of freight toppling over from our heavy wallowing, we came off Ancón, on the south side of the peninsula. Here, during the course of many hours, we discharged most of our passengers and their belongings in two big *bongos* or dugouts sent from shore. Children, dogs, boxes, sacks, oil tins, bottles, furniture, bunches of plantains, and packages bound up in newspaper were all lowered gingerly over the side until the bongos were loaded like the ark. Fortunately, the captain invited us to breakfast during the long delay. The majority of our fellow travelers had no food and wanted none, but the babies who were nursing all over the baggage piles were an exception.

Rarely could one find a more unhappy assemblage of human beings than these who huddled under the dripping awning of the "Cypress" through this soaking, riotous night and for half of the day that followed. Most of them were landmen, and the experience must have been one of unalleviated misery, as it doubtless was also to the unfortunate turkeys, tied by one leg on deck, utterly dejected from galline seasickness, and rocking back and forth to maintain a standing posture while water from the gushing scuppers swashed across their toes.

The "Cypress" rounded Point Santa Elena, and the calm waters of the lee side put an end to twelve hours of battering. The peninsula was green for the first time since 1919. A month before the whole country had been burnt up with drought, and burros, cows, and goats, reduced to hide and bones, had gathered daily about the cable station to fill their bellies with bushels of discarded paper tape. Then came the first showers, and many cattle died in the new mire because they lacked strength to extricate themselves. Now the survivors were living in what was beginning to be a green land of plenty. During a month on the coast we experienced but one entirely rainless day (February 21) and one rainless night (February 24–25). The middle land of the peninsula became a great morass; grass and shrubs sprang up everywhere from what had been bare ground; verdant lines worked down the seams of cliffs facing the sea. The captain of a steamer, which came close in shore while rounding Santa Elena on the route to Guayaquil, remarked that but for confidence in his own navigation, supported by his recognition of the wooden lighthouse, he would have believed himself in another part of the

world. "The lighthouse is the same," he said, "but the country is new."

From the hospitable residence building of the International Petroleum Company, headquarters for all of our excursions up the coast, the pleasant beach of Salinas curves out to the flat-topped promontory of Santa Elena, the haunt of hawks and lizards, and stray songbirds. The beach is a popular seaside resort for citizens of Guayaquil. Many of the better cottages are half hidden by high palings of split bamboo which completely enclose the grounds. It is as if each owner regarded his home as a castle which required also a wall; and now the rains had come to add a moat as well. Scattered along shore among the more pretentious dwellings are the shacks of the Indian fishermen, comfortable enough, no doubt, in most years, but ruinous to contentment now. In fact, one of the best testimonies to the prevailing dryness of the climate of Santa Elena is the total lack of provision against rainfall in the construction of practically all buildings.

Our home, for the duration of our visit, was ventilated under the northerly gable by one of the wide lattices so characteristic of the region; but alas, it was from the north that the greater part of the precipitation came. On certain nights the slanting rain pelted through the entire house so that there was absolutely no escape from it. Floors and tables, beds, books, and all other valuables became drenched. One could only cover his possessions with ponchos and go to sleep for lack of other occupation, while Piper, our hosts' great Dane, went whining through the reeking rooms in sheer despair.

And now, following the soaking of the soil and the sprouting of vegetation, came the plague of insects—not mos-

quitoes or other biting pests, but merely flies and bugs, beetles and moths, which obscured the bright electric bulbs and peppered the walls and tablecloths with moving specks of various sizes and modes of progression. Water beetles plumped into the soup plates; large, metallic bombardier beetles, or carabids, which prey upon caterpillars, dashed about the lighted rooms in the evenings, filling the air with their squirts of iodine. And the caterpillar-producers, too, flocked to the lights—numberless brown sphinx moths belonging to a cosmopolitan species (*Celerio lineata*) which is distributed in America all the way from Canada to the southern tropics. At Santa Elena, it is probable that the pupæ had slept for seven long years in the ground, biding the millenium.

The rains had no apparent effect upon the sea birds in Santa Elena Bay, unless the absence of petrels can be attributed to this cause. All other expected kinds were common everywhere along the coast, besides being absurdly tame, as birds always are on a fishermen's shore. The brown pelican was the most conspicuous species close to human settlements. In the outermost cove on the lee side of the point, where a seine was hauled each afternoon, the pelicans plunged all day regardless of the number of balandras at anchor or of small boats at work. They dropped sometimes from as high as fifty or sixty feet above the water, ungainly creatures at the start but twisting with a certain grace during the descent so as to be gliding upside down at the instant before they disappeared beyond the tips of their long wings. Sometimes a dozen tumbled together, half of which might barely miss the bongo which had, perhaps, startled their prey into view from aloft

Reminiscences of this open coast would be incomplete without a word about the bongos, which here largely replace the low-sided canoes of sheltered waters. In digging a more or less seaworthy boat out of a gigantic tree trunk, the Ecuadorean no doubt performs a creditable feat, nor is it to be denied that he has developed high skill in managing the craft in rough water. If it were not exceedingly well handled, indeed, it would turn turtle in a moment. And yet, not being able to accept with the equanimity of an Indian (who wears but two garments and carries no watch in his pocket) the experience of pitchpoling in high surf on a steep and treacherous shore, my memories of bongos are none too kindly nor my trust in them more than that of necessity.

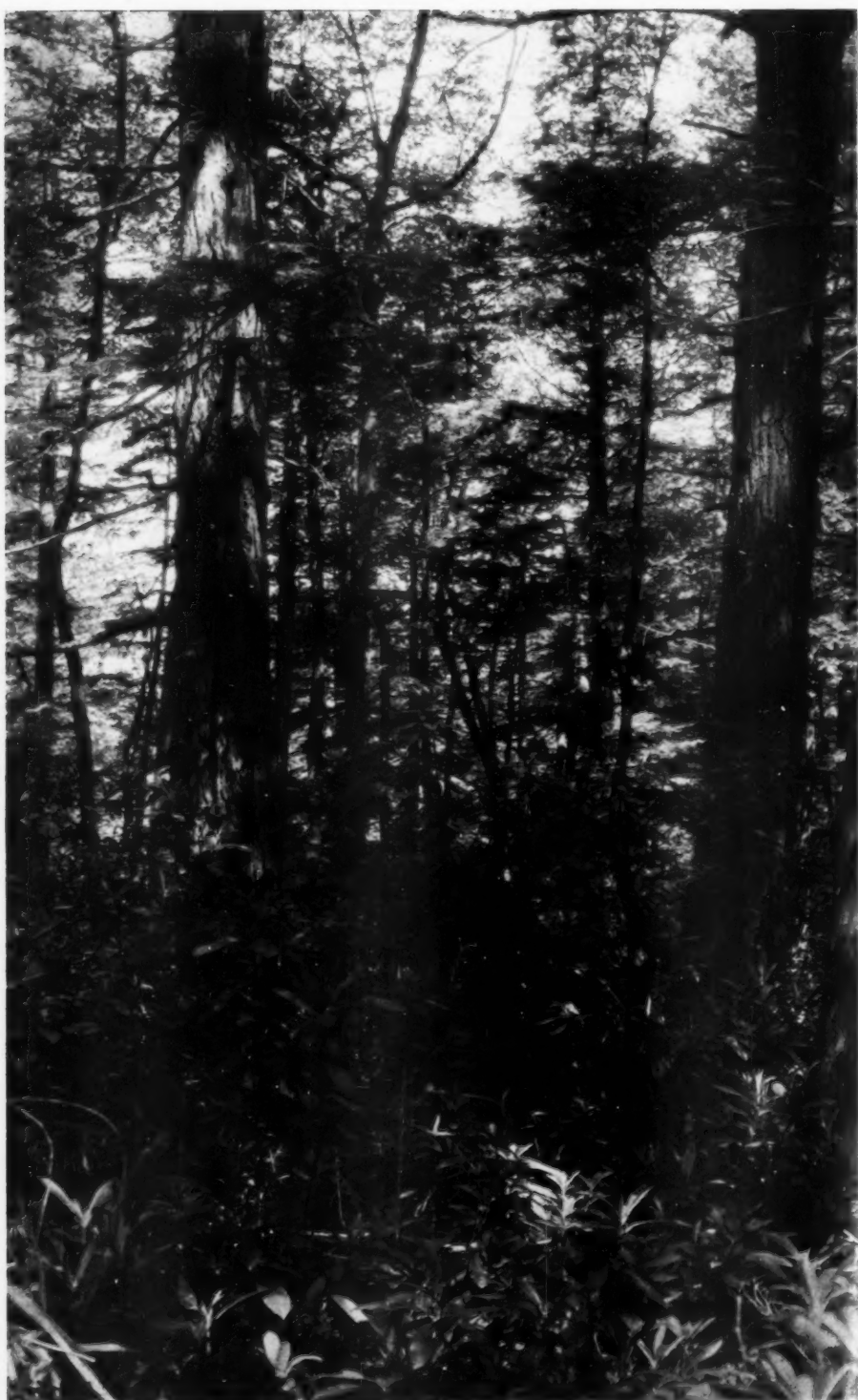
How often our hearts stood in our throats as we rode through the breakers in the only possible manner, with the heavy hollow log full of specimens, guns, cameras, or still more delicate instruments! And disaster came sufficiently often to make each landing and launching an ordeal. Late one evening we returned by launch to Salinas from Pelado Island, and prepared to make our way ashore by the beams of four electric lights cast out from the house across the water. The day had been gusty and the sea rugged, but the bongo was manned by two trustworthy boatmen, and, at any rate, we had no choice save to spend the night without supper on board a tossing launch.

We could hear the pounding of surf, but, for all we could make out in the black water, it seemed quite navigable. Now we were near the beach where the swell was ominous, and back and forth we oscillated, again and again, while Pedro peered around like a cat in the darkness.

"Espera—por atrás, por atrás! Vamos —ya! ya! ya!"

We spurted forward behind a line of foam. In front, not far, was the dark slope of the strand, and waiting Indians thigh-deep in white water. But just before we reached them, the stern heaved up to perpendicular and then jerked aside. The detonation of ponderous waters clanged in my stunned ears, and sand ground into my nostrils as the bongo and its erstwhile occupants rolled ashore together.

Old Pancho, a lean, grizzled Indian whose home stood outside the enclosure of our headquarters, owned the best and largest bongo on the beach. Its gunwales were lined with buoyant balsa wood, and to Pancho and his stalwart sons was entrusted all the lighterage of the petroleum station. The whole family shared a pride, an independence, and a suppleness, which apparently distinguish the Indian who lives beside salt water from his servile and seemingly stupid compatriot of the mountains. Pancho rejoiced in surf. He had the enviable reputation of never having allowed his bongo to capsize while bearing a passenger. He possessed an innate sense of responsibility, for no matter how gloriously drunk he chose to make himself, he was never incapacitated for the most exacting boat service at any hour of the day or night, and he could, moreover, shoulder a heavy crate as well as the strongest of his sons. Yet, for all his skill and noble bearing, he was a mean old scoundrel. When I gave him a parting gift of many *sucres*, he had the effrontery to remind me that I still owed him ten centavos for a miserable fish; but when I laughed in his face, he forgot his importunities and waved a smiling farewell.



PRIMEVAL HEMLOCKS ON WAWAYANDA MOUNTAIN

The dense undergrowth of great rhododendron is the haunt of the Canada warbler

The Summer Birds of Northern New Jersey

By WALDRON DeW. MILLER

Associate Curator

THE study of ornithology in the eastern United States dates back to colonial times, for almost two hundred years ago, long before the days of Wilson and Audubon, Catesby's great work on the *Birds of the Carolinas* was published.

It is a far cry from the days of these early pioneers to the present widespread interest in bird life. All of our eastern birds have long been described, their songs recorded, and their nests and eggs discovered, yet regarding the local distribution of many species even in the region about New York City we still have much to learn. Until a few years ago we were wholly ignorant of the summer bird life of certain sections of northern New Jersey within two or three hours' travel from the metropolis.

In 1904, the American Museum of Natural History issued Doctor Chapman's *List of the Birds Known to Breed Within Fifty Miles of New York City*, and two years later his *Birds of the Vicinity of New York City*, essentially a revision of his 1894 list. Here are recorded the regular breeding of the alder flycatcher, which the present writer had found near Plainfield, and the discovery by Mr. B. S. Bowdish of the nest of the black-throated green warbler at Demarest, on the Palisades. Meanwhile Mr. P. B. Philipp had found the brown creeper nesting regularly in a swamp near Newton, Sussex County, and with Mr. Robert H. Southard and others had established the regular breeding of the prairie horned lark on the bare, rolling hills

near the same town. None of these species had previously been known to nest within the limits of the State.

The year 1909 saw the publication of Doctor Stone's *List of the Birds of New Jersey*, issued by the New Jersey State Museum. The preparation of this work had emphasized our almost complete ignorance of the bird life of this section. To fill in this important gap in our knowledge of the local avifauna, three members of the Delaware Valley Ornithological Club, Dr. William E. Hughes and Messrs. S. N. Rhoads and W. L. Baily, made a week's trip early in June, 1909, through the highlands of Passaic and Sussex counties, touching Macopin or Echo Lake, Greenwood Lake, and Wawayanda, Mr. Rhoads continuing on to Beaver Lake and the Walkill Valley. An account of this trip, written by Mr. Baily, with an annotated list of the ninety-four species observed, is to be found in *Cassinia*, 1909, pages 29-36.

The most notable results of this trip were the black-throated blue warbler, a single male observed, and the Canada warbler, found commonly in three localities, both new to the known summer avifauna. The alder flycatcher, golden-winged warbler, parula warbler, and black-throated green warbler were also recorded, as well as the chat, hooded warbler, worm-eating warbler, and Louisiana water-thrush. Mr. Baily expresses surprise at the number of Carolinian species observed, even at the higher elevations, and at the very weak Canadian element, opining that the altitude is just below

the limit to attract such Canadian species as breed in the Pocono region of Pennsylvania.

For a number of years past the writer has made frequent trips to the mountains of northern New Jersey to study their plant and animal life. The Canadian tinge indicated by the few records of earlier observers has been found to be stronger than Mr. Bailly suspected. Nevertheless, it is largely restricted to the most favorable situations, and can be easily overlooked if the right localities are not visited and thoroughly searched. This is well shown by the experience of the three Delaware Valley Club men who, in their trip through the heart of the most Canadian section, missed several of the northern species since discovered there.

The most important finds since 1909 may be briefly mentioned. In 1915 and 1916 a pair of nesting Canada warblers was found by the writer at Budd's Lake, Morris County. This is still the only known breeding station in the State, outside of Sussex and Passaic counties, not only for this warbler but for any Canadian zone species.

On May 30 and again in early July, 1919, Mr. Ludlow Griscom and the writer visited Bear Swamp in the Kittatinny Mountains near Lake Owassa. Here the Canada warbler proved to be actually abundant, ten adult males and six females being counted in a walk through the swamp. Several northern water-thrushes were also found on each visit, the evidence indicating that they were breeding.

In June and again in July, 1920, Mr. Griscom visited Lake Mashipacong in the Kittatinny a few miles south of the New York line. The Canada and Nashville warblers and the northern water-thrush were found, all evidently

settled for the summer, the Canada warbler being especially numerous.

Meanwhile the writer had made several trips to the mountains southwest of Greenwood Lake, and had found the Nashville, Blackburnian, black-throated blue, black-throated green, and Canada warblers, the northern water-thrush and the hermit thrush, all summering in the region. These are recorded in *The Auk* for 1920 and 1921. Continual investigation during the past three years has yielded further returns, and there can now be recorded from the same region, the purple finch, blue-headed vireo, magnolia warbler, and brown creeper, all presumably breeding.

East of Bearfort Mountain, in a mountainous section known as the Wyanokie Plateau, Professor Will S. Monroe has for some years conducted an early June bird census in which a number of local naturalists have participated. Though this region is somewhat less elevated than Bearfort and Wawayanda mountains and with less coniferous growth, its summer bird life is not so strongly Canadian, yet such species as the Nashville, Canada and black-throated blue warblers evidently breed there, and, there is reason to suspect, also the northern water-thrush and the hermit thrush. Our knowledge of the Kittatinny region has been increased during the present year by a trip to Lake Mashipacong on June 14 and 15, by members of the Linnæan Society, including Messrs. Griscom, Howland, Urner, Weber, and others. Five separate routes were covered and eighty-nine species observed. With the exception of the magnolia warbler and the hermit thrush all of the northern species of the central highlands were recorded.

This brief sketch brings up to the present time the ornithological history of the long-neglected mountain regions of northern New Jersey. We have gradually discovered in the last twenty-five years that the Canadian fauna, although not in its full development, must be indicated on our faunal maps of the state. The avifauna is decidedly less boreal than that of the Pocono region of Pennsylvania or the Catskills in New York, and is comparable to that of northwestern Connecticut. Other northern species may yet be discovered in some unexplored section, such as the junco or the winter wren, while it is highly probable that the saw-whet owl has been overlooked because of its secretive habits.

The salient topographical features of New Jersey may be briefly indicated. The southern half of the state is mainly a low sandy plain, the greater part occupied by the well-known Pine Barrens, with a very characteristic flora and thoroughly Carolinian fauna. Immediately above the contracted middle of the state, the north central portion is occupied by a broad belt of Triassic red shale and sandstone which runs diagonally from northeast to southwest. Prominent features of this area are several ridges of trap rock including the familiar Palisades of the Hudson and, farther southwest, the Watchung or Orange Mountains. These hills rarely exceed a height of six hundred feet, an altitude insufficient to effect any change in their plant or animal life. Accordingly their birds are essentially the same as those of the surrounding country, a mixture of Carolinian and Alleghanian forms. Here we find such transition species as the black-capped chickadee, veery, chestnut-sided warbler, rose-breasted grosbeak, and least flycatcher, asso-

ciated with typically Carolinian birds such as the tufted tit, blue-winged warbler, cardinal, and others that range somewhat farther north, as the white-eyed vireo, orchard oriole, chat, worm-eating warbler, and Louisiana water-thrush.

The northern part of the state above the red shale belt is the true mountain section. Two parallel ranges of mountains enter the state from southern New York, cross the northern counties diagonally and continue across the Delaware into Pennsylvania. It is only in these mountains that we find any suggestion of the Canadian fauna and flora, and even here only in the higher and ecologically favorable portions.

Traversing the two northwestern counties, Sussex and Warren, is the Kittatinny range, a familiar feature to all who have crossed the Delaware River at Dingman's Ferry or visited the Delaware Water Gap, yet, until recently, almost unvisited by ornithologists. These mountains attain their greatest elevation at the north, High Point, a few miles south of the New York line, reaching a height of about 1800 feet, the highest point in New Jersey. Scattered ponds and swamps on the summit of the range or in the hollows are the headquarters of most of the more interesting birds. Toward the southwest the range becomes dryer and less productive, but unfortunately this section is almost wholly unknown. We now know in a general way the character of the summer bird life of the northern part of the Kittatinny, but further field work will doubtless add a few additional Canadian species. The Canada warbler is one of the most abundant species in favorable localities, while the northern water-thrush, Nashville, Blackburnian,



A rounded outcrop on Bearfort Mountain. Laurel and a young white pine on the ledge, scarlet and chestnut oaks surrounding it. The nighthawk lays its eggs on these bare ledges and rattlesnakes find refuge among the rocks

black-throated green, and black-throated blue warblers, the blue-headed vireo, and the brown creeper have all been recorded.

The second mountain range, known as the Highlands of New Jersey, is a system quite distinct geologically from the Kittatinny and notable for its great antiquity. This range enters the state on both sides of Greenwood Lake and following along the southeastern borders of Sussex and Warren counties, extends into Pennsylvania as far as Reading. In the northern portion, the mountains reach an elevation of more than 1400 feet. Farther south the altitude decreases and conditions are less favorable for northern birds, but until this section is more thoroughly searched we can say little regarding its summer bird life.

In the northern part of the Highlands, I have, in recent years, in spring, summer, and early fall, spent many

days exploring the swamps and forests of Bearfort and Wawayanda mountains and have acquired a fairly complete knowledge of the summer bird life of the region. This is essentially like that of the northern Kittatinny, already described. Judging by our present information, the Canadian element is slightly stronger in the Highlands, for the two birds occurring here, the magnolia warbler and the hermit thrush, have not as yet been found in the Kittatinny.

Bearfort Mountain is a picturesque ridge locally known as Rough or Rocky Mountain, a succession of parallel outcropping ledges of lichen-covered conglomerate, separated by narrow bushy depressions often only a few yards in width. Much of the forest growth is of rather small deciduous trees chiefly chestnut, oak, and other species of *Quercus*, with stunted pitch pines on the rocky outcrops. In spots

where soil conditions are favorable there are groves of hemlocks and occasional white pines, while near Cedar Pond there is a small swamp of spruce, larch, and white cedar.

Wawayanda Mountain, on the west, is geologically different from Bearfort Mountain, and lacks the very rugged character of the latter. Here on the northwest slopes and bordering the swamps are fine groves of hemlock, which evidently find ideal conditions of growth, for scattered individuals attain a large size.

Visiting these shady coniferous woods in June we are greeted with the voices of warblers which, in the lower parts of the state, we know only as migrants to and from their summer homes. From the graceful sprays of the hemlock, almost hidden by the intervening foliage, the wiry song of the Blackburnian warbler may be heard at short intervals, while the listener below cranes his neck to catch a glimpse of the elusive songster. One glimpse of his flame-colored throat not only serves to identify him but is ample reward for one's patience.

From lower down in the deciduous growth comes the drawling and unmusical, yet curiously pleasing, song of the black-throated blue warbler, and we may get a view of the small performer in his refreshingly simple and individual dress of slate-blue, black, and white. Dense thickets of the great rhododendron fill the swamps and often invade the lower slopes under the hemlocks. In midsummer their regal blossoms of white and rose present a spectacle long to be remembered. These thickets are the chosen home of the Canada warbler, probably the most numerous of all the northern birds of the region. Its southern relative, the beautiful hooded warbler, is often

heard and seen at the same time, but, unlike its congener, is not confined to the rhododendrons, its favorite haunt being the rocky deciduous woods with an undergrowth of mountain laurel.

Another southern species frequent on the rocky slopes is the plain-colored worm-eating warbler, while the black and white warbler and the ovenbird are found everywhere in the woods and the somewhat local redstart is of common occurrence.

In the cold swamps where the wild calla and the *Naumburgia* flourish, the liquid song of the northern water-thrush greets one at intervals. At lower altitudes this species is replaced by its southern congener, the Louisiana water-thrush, which, as a rule, affects rapid, rocky brooks rather than swamps.

Wherever there are white pines we are sure to hear the pleasing song of the black-throated green warbler. At a distance only the one or two louder notes of the song are audible; the effect is curious and will puzzle one until he has learned their source. Two common breeding warblers of rather northerly range are birds of the margins of the woods or swampy openings rather than true forest species, the Nashville and the golden-winged. The former is particularly fond of the groves of white birches, and when not in song may be easily overlooked. The goldenwing's *zee zee zee zee*, one high and three lower notes, is one of the characteristic sounds of country roadsides. This species entirely replaces its close relative, the blue-winged warbler at higher altitudes. Lower down, as in the Wyanokie foothills, the two occur together and hybridization is frequent.

Another warbler, the jaunty chestnut-sided, an Alleghanian species reaching its southern limit at sea level in the

central part of the state, is here one of the most abundant birds, as many as thirty-five adults having been counted in a day's trip. Like the preceding, it is a bird of young second growth and roadside and its strongly accented *very, very glad to meet you* is even more frequent than the insect-like song of the goldenwing.

The rarest of all the northern warblers here is the dainty magnolia, which has been found at only three spots in the Highlands and is unknown in the Kittatinny's. There can be no reasonable doubt, however, that it is a regular summer resident in the northern highlands.

Excepting the ubiquitous red-eye, vireos of all kinds are scarce. The yellow-throated species has been met but a few times above an altitude of 1000 feet, where it is replaced by the blue-headed or solitary vireo, which, however, is a scarce bird in this region. The brown creeper is another local and uncommon bird. Twice I have met a brood of young, not long from the nest, attended by their parents.

It was long before I learned of the occurrence of the hermit thrush in these mountains. Finally, in 1921, a pair was discovered on the top of Bearfort Mountain above Cedar Pond. Single birds have been met a few times since, and probably a few pairs breed each year. The hermit thrush, while mainly a Canadian Zone species, summers in the low pitch-pine woods of Long Island. It is, therefore, strange that it should be so scarce in the Highlands and thus far unrecorded in the Kittatinny's at this season.

The Wilson's thrush, or veery, is very common in the swamps and lower woods, while the wood thrush appears less numerous than in many localities, owing partly, no doubt, to its very

retiring habits and the fact that its song is seldom heard except toward evening.

An anomalous case of distribution somewhat like that of the hermit thrush is presented by the purple finch, which is a regular summer resident, even at sea level, in Connecticut and Rhode Island. There were a few summer records of single individuals at Englewood and Plainfield, but until two years ago, there was no evidence that the species bred in New Jersey. On August 13, 1923, I met a family of six birds including an adult male, in a bushy swamp near Dunker Pond, feeding on the fruit of the chokeberry (*Aronia melanocarpa*). Presumably this family was raised in the vicinity, but as Dunker Pond is only a few miles from the New York State line, it is possible that the birds may have wandered this short distance. The Linnæan Society's census in the Kittatinny's in June of the present year recorded five purple finches, four males and one female, in three spots. It cannot be doubted that this attractive songster nests in the extreme northern part of New Jersey.

Comprising as it does one of the wildest and most heavily forested regions in the state, it is not surprising that the Highlands should be a refuge for certain animals that have disappeared from the more settled sections. Rattlesnakes and mountain black snakes are not uncommon, the native wood rat lives in the caves among the rocks, deer are fairly common, and wild cats are occasionally shot by hunters. The ruffed grouse which has been extirpated over considerable portions of the state and barely manages to survive in others, is here numerous. To the ornithologist, perhaps the most interesting inhabitant of these wilds is



PILEATED WOODPECKER
(Courtesy National Association of Audubon Societies)



the pileated woodpecker or logcock, the largest of our northern woodpeckers and a truly notable bird. Long supposed to have disappeared from the state, it is now known to be a permanent resident in the Kittatinny, in the wilder sections near Andover, and in the Highlands. In all probability it has never been completely extirpated from New Jersey, for evidence of its existence for many years back is to be seen in the great oblong "mortise holes" in dead chestnuts, so characteristic of the logcock. Some of these were evidently made many years ago. At the same time testimony of the more observing inhabitants indicates that in recent years there has been a decided increase in the numbers of this fine bird. Even where common, however, it is, owing to its shyness and its fondness for dense forest, by no means easy to observe, and its flicker-like call or loud tattoo may be heard on many occasions before an individual is seen.

The raven, the bald eagle, and the great blue heron may all nest in very small numbers in these wilder regions. Mr. Justus von Longerke saw a pair of ravens near Culver's Gap in the Kittatinny on September 21, 1918, and secured one. Possibly these birds were natives of the locality, but since that date, none has been seen there. Both in the Kittatinny and in the Highlands the turkey vulture, long regarded as a typically Carolinian species, is daily in evidence soaring over the summits of the mountains. Loose parties of six or eight birds are commonly observed, and occasionally several times this number. They are rarely seen alighted and how they find sufficient food to keep themselves alive is a mystery.

It is unnecessary to mention all of



Holes in a dead chestnut made by the pileated woodpecker in securing wood-boring grubs. The largest cavity is eight inches high, four and one-fourth inches wide and fully six inches deep

the species that have been recorded from the Highlands in the breeding season. The greater number are birds of more or less general distribution in New Jersey and such as are found in the immediate vicinity of New York City. On the higher plateaus as, for example, the elevated valley between Bearfort and Wawayanda mountains, more than 1000 feet above sea level, not only are such typically Carolinian species as the cardinal, tufted titmouse, and

blue-winged warbler absent, but the orchard oriole, white-eyed vireo and, surprisingly enough, even the yellow-billed cuckoo, have not been recorded. The wood pewee is inexplicably scarce in this region, while a curious case of local absence in the valley mentioned is that of the meadow lark.

To the botanist these mountains are as fascinating as they are to the bird lover. Scores of characteristically Canadian plants have been found here

and others are constantly being discovered. Among them are the striped maple, painted *Trillium*, bunchberry, *Clintonia*, fringed *Polygala*, and several species of orchids.

It is to be hoped that these mountain forests with their ancient hemlocks will long endure to afford protection to their animal and plant inhabitants, which present so interesting a contrast with those of the lower portions of the state.



A waterfall by the roadside above Greenwood Lake. Hooded and Canada warblers nest in the vicinity



An adult crowned eagle, in defiant attitude, at the New York Zoological Park. The dark-barred breast indicates maturity, and the size of the feet suggests their great strength. Photograph by E. R. Sanborn, supplied by the New York Zoological Society

The Crowned Eagle, Ogre of Africa's Monkeys

By JAMES P. CHAPIN

Associate Curator

EAGLES always appeal strongly to the imagination. They serve as symbols of courage and prowess in the countries of the north; and as powerful birds of prey they arouse the admiration of the natives of the forested tropics, where often there are large eagles that feed on monkeys or other mammals. *Pithecophaga jefferyi*

is the little-known monkey-eating eagle of the Philippines; tropical America has the imposing harpy eagle, *Thraustetus harpyia*; New Guinea has the *Harpyiopsis novæ-guinææ*, which devours wallabies; and a corresponding bird in equatorial and southern Africa is the crowned eagle, *Stephanoaëtus coronatus*.

From time to time zoölogical gardens in Europe and America exhibit this bird alive. Though it is not quite so large as the harpy, one is impressed by the great size and strength of its claws and feet, the latter being feathered down to the bases of the toes, and differing in this regard from those of the other species mentioned above. While still immature, the African crowned eagle is a gray, white and buff nondescript; but, reversing the common rule among birds of prey, it becomes less uniformly colored when adult. Then the upper parts are mainly slaty black, while the breast is heavily barred and the legs thickly spotted with black. The quills of the wings and tail are broadly barred with gray and black. The back of the head is adorned with a flattened crest, more or less divided in the mid-line, from which its common name has arisen.

Judging from the frequency with which live birds reach Europe, and the fact that this species, like the harpy, was named by Linnæus more than a century and a half ago, it might seem that its habits in the wild state would be well known. As early as 1799 François Levaillant¹ recounted his observations on a nest in South Africa, but he mistook the newly fledged young in its gray and white dress for the adult, as did Sir Andrew Smith in 1844. Near Grahamstown in Cape Colony a pair,

so it is said, nested in the same tree for thirty years, and their aerie was visited by many South African ornithologists; but nearer the equator, where the species is probably most numerous, very little has been learned—or at least written—of the occurrence and behavior of Africa's monkey-eating eagle. While searching the



A young crowned eagle with head turned so as to show the form of the crest

literature that deals with the birds of the Belgian Congo, I have found but two references to specimens having been procured in that vast area of approximately 928,000 square miles, the greater part of which is undoubtedly inhabited by this bird.

The reason is not far to seek. The

living examples sent home to animal dealers and menageries are taken from the nests by blacks, their history is soon lost, and they do not figure in technical articles or books on bird distribution. The white collector in Africa, on the other hand, seldom secures a skin for his collection, so wary are the birds when once they have left the nest. He is lucky if he even sees the eagle alive. To this I can testify from my own experience while with Lang in the Congo, during our six-year expedition for the American Museum. Of the two published records from the Belgian Congo, one is of a skin from the Itimbiri River in the Brussels Museum, the other an account in the notebooks of Emin Pasha of three young birds received from the Mangbetu country and kept in captivity at Lado on the White Nile.

¹*Histoire Naturelle des Oiseaux d'Afrique*, Vol. I, pp. 12-16, Pl. III.



Chief Senze of the Mangbetu tribe wearing feathers of a crowned eagle

The following is an unvarnished account of our protracted efforts to observe and capture what I regard as Africa's noblest bird of prey. Lang and I had already spent about six months in the rain forests from Stanley Falls to the northern Ituri district, when one day we observed a gigantic bird-claw strung on a woman's necklace. To our inquiry she replied that it came from a large bird known to the Medje tribe as *netumu*, the feathers of which were

eagerly sought by the men of the tribe. Months passed, however, and neither we nor any of the native hunters with us succeeded in finding the bird.

Then we traveled northward to the country of the Mangbetu,¹ who live

¹The term Mangbetu is here used in its broad sense to include the mixed population of the region just south of the post of Niangara, where Bangba, A-Madi, and other tribes live mingled in the same villages with the Mangbetu clan, earlier rulers of the district. The Mangbetu dialect is still the most important in use there. Okondo, as is well known, was a Bangba, though in many ways the true successor of the old Mangbetu king, Munza. My black assistant Nekuma, from Okondo's village, would describe himself as a Madi.



Senze and a few of his people. One woman is wearing a hat with the long white tail feathers of the paradise flycatcher

just beyond the border of the forest country; there we began to see feathers of our long-sought eagle adorning the hats of some of the men. They called it by the same name as did the Medje. Here only the "nobility," the chiefs and their relatives, were permitted to display these feathers, which were split down the middle of the shafts and hung in loose bunches from the brimless straw caps. This restriction on the wearing of certain feathers, an old custom among the Mangbetu, was noted by Emin Pasha during his visit in 1883. Other feathers which the common people were not permitted to wear, were those of the large fishing owl or *nebi* (*Scotopelia peli*), the red wing-quills of plantain-eaters or *nombo* (genera *Turacus* and *Musophaga*), and the long, white tail-feathers of the paradise flycatcher or *mandalungwe* (*Terpsiphone*

viridis). Red tail-feathers of the gray parrot, of wide popularity in the Congo, were less jealously regarded by the Mangbetu chiefs.

Everywhere we asked about the *netumu* and how it could be found. Okondo, one of the most important chiefs of the region, told us he had one alive which had come from a forest to the south; and it was proudly brought forth in a large basket carpeted with the feathers of chickens on which it had been fed. The light-colored plumage betrayed its youth, but Okondo wished to present it to his guests, and we were glad to have it. We could not, however, carry it along in its cage, and the quickest way to prepare it for skinning was to offer it a bit of meat containing strychnine. Okondo was tremendously impressed with the efficacy of the poison. No gifts would he

have in exchange unless they included a phial of the deadly poison. After long argument and many solemn cautions, Lang presented to him a tiny bottle of powdered boric acid. Let us hope that Okondo never tried to poison an enemy with it.

For the next couple of years we were hunting in the more open grass country to the northward, the home of the white rhino and giant eland. The crowned eagle was heard of no more until we returned to the forest. I had scarcely entered its borders near the Bomo-kandi River when my guides led me off the road to show me a tree with which they were familiar, where the *netumu* had built two huge nests, masses of sticks that would fill a cart, but not then in use. It was in July, and the birds would come back, I was assured, later in the year. Hanging from the boughs of this same tree there were more than a hundred empty nests of weaver-birds, placed there doubtless for the protection the eagles would afford.

Continuing southward to Avakubi, only one hundred miles from the equator, I made frequent efforts to locate another nest, or to see the birds themselves. But though all the tribes encountered were familiar with them, I was unsuccessful. The Mabudu name for them was *inju*, and that of their neighbors the Balika, *windi*. The Wabali on the Ituri River knew them as *ndūa*, but during my prolonged stay at Avakubi they did almost nothing to aid me in locating a nest. Once I

believe I saw the bird circling over a clearing, but a long way off, too far even to identify with my bosom companion, an eight-power glass. I was shown feathers of one that had been killed up-river near Penge, and a flat native-made skin from the River

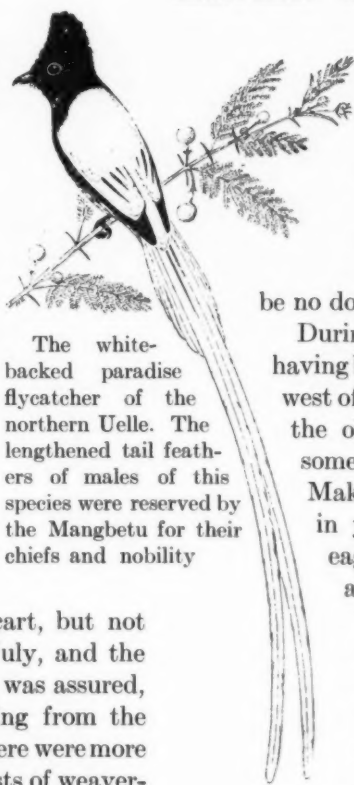
Lenda. Monsieur Bernard, the gracious administrator then in charge of the country round Avakubi, assured me he had once received young birds alive at Makala, so there could

be no doubt of their presence.

During this time Lang was having better fortune at Niapu, west of Medje, while studying the okapi. In November some Pygmy hunters of a Makere chief began to bring in young of the crowned eagle, which were kept alive for some time and photographed. In response to Lang's presents the hunters proceeded to capture several old birds, two of them on the ground, in traps baited with

dead monkeys. Lang went out to see the nests, but was too busy with large mammals to investigate further. Now at last we had satisfactory specimens, but my own desire to know the birds in life was unappeased.

The native population along the Ituri River is mixed, for in addition to the original tribes, Wabali, Bandaka, and the elusive Mambuti or Pygmies, there are large villages of Bangwana, remnants of the black slave-raiders formerly led into the country by Arabs, and joined by the accumulated riff-raff of the



The white-backed paradise flycatcher of the northern Uelle. The lengthened tail feathers of males of this species were reserved by the Mangbetu for their chiefs and nobility



A young crowned eagle reared by Herbert Lang in the Congo

country itself. Few of the Bangwana are hunters. They trade, and they grow rice—besides wearing white clothes and professing the faith of Mohammed. They do not eat wild



A hunter of the Makere tribe carrying a dead crowned eagle

pig, but are not loath to trap this unclean ravager of their farms, to smoke its meat and sell it to their heathen neighbors, whom they regard as *washenzi* or barbarians. The most influential chief of these Bangwana in the vicinity was Kalonga, an elderly man of Bakusu origin, who remembered Stanley and his early visit to the Man-yema district. Kalonga and I had known each other for more than four years, and he had given me one amusing instance of his views on unclean meat. A hippo I had killed at Avakubi was cut up and divided among our workmen and those of the government post, without a thought of offering any to Kalonga. Soon afterward he complained of my stinginess. I replied that the creature could surely not be eaten by a Moslem. "No, not if it had died on land," said Kalonga, "but you killed it in the river; and that made it just like a fish. We are very fond of fish."

To Kalonga I often confided my longing for the eagle, and eventually he announced that one of his men had located a nest, and had fired his muzzle-loader ineffectually at one of the birds. Both statements made me happy. Lang's experience a little farther north indicated that eggs were laid in October. It was now early March, so even allowing for a prolonged stay in the nest—and eagles grow slowly—the breeding season must be finished. James Barnes and Cherry Kearton were in Avakubi at the time, on their way across the continent after filming the big game of East Africa. On March 9 we bade one another good-bye, and I set off for a tiny village some five hours to the southwest. The night was passed with some Wabali who specialized in drop-spears for elephants. Early the next morning we stood beneath a gigantic tree in the forest, somewhat isolated

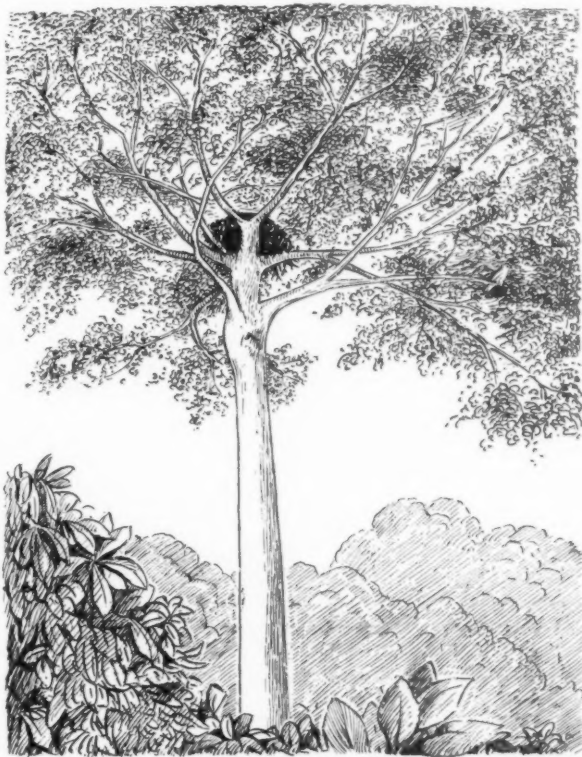
from all its neighbors, bearing the eagles' nest. As we approached, we heard the call of the young bird, high-pitched notes strung out nearly to a trill, when they did not sound more like *ki-ki-ki-ki-ki*— or *kwě-kwě-kwě-kwě*—. Practically full-grown, it still sat on the boughs of the tree where it had been hatched, moving about occasionally, yet not following its parents on their hunts.

The nest was an enormous pile of dry sticks and pieces of lianas, placed in one of the great forks near the middle of the tree, which was absolutely free of epiphytic plants or creepers. Later on, when I watched a man climb up beside it, I realized for the first time how large it was, and judged it to measure six feet, if not more, across the top. The distance above the ground was about thirty-five yards. Determined to see and, if possible, to shoot one of the old birds for our collection, I spent most of the next three days watching the nest. The young bird seemed still attached

to the spot, flying only occasionally to neighboring trees, and calling frequently. Sometimes it would sit on one foot, resting the other heel on the branch, or would extend a wing and the leg of the same side simultaneously, as well as spreading the tail. Storks and many other birds stretch in this same way.

Rifle in hand, with Nekuma, a young Mangbetu who accompanied me

as "assistant ornithologist," I sat on the ground in an elephant path at a spot offering a view through the foliage up to the nest. Nekuma was the son of Okondo's old witch-doctor, and his name was the Mangbetu word for rain, in allusion, he told me, to the



Nesting tree of crowned eagles. From a pencil sketch made by the author as he sat on the ground waiting for the old bird to visit it

tears he shed in babyhood, perhaps while his head was wound with cord to give him a stylish, lengthened skull. This negro bird student was almost as keen as I to see a *netumu*. I doubt if the old birds normally returned more than once or twice a day, at this stage, to feed their offspring. They certainly knew we were there.

The first afternoon I was lured away by the yelling of a band of chimpanzees

feeding in the trees, and succeeded in bagging their hoary-backed patriarch. Most of his companions were down on the ground before the echoes from the rifle had died away; but as I reached the fallen leader, a shaggy, black "boy-chimp" came sliding down the trunk of a near-by tree. I hadn't the heart to raise a gun in his direction. Once these apes have reached the ground in the heavy forest, one may give them up as lost. It is with strangely mingled feelings that one looks upon a fine dead chimpanzee such as this one, with chest deflated measuring forty inches, and a spread of arms of six and a half feet. My first experience in shooting monkeys almost wrung my heart, and I know of nothing closer to murder than the killing of a chimpanzee. Would that those who ridicule the idea of any possible relationship between the apes and man could know a little of anthropoids in their natural environment.

Back at my post nothing had changed, and nothing happened till nightfall sent us stumbling back over roots and rivulets by candlelight to our lodging in the forest hamlet, five or six mud-walled huts. Mine contained an interesting array of iron spears to be inserted in logs of wood and hung over the paths through the forest, as traps for passing elephants—making passage rather risky for visiting naturalists.

The whole of the following day was spent beneath the nest. Only once, toward eleven o'clock, did an old bird visit it. Natives had often told me that the ground beneath the nesting tree would be littered with the bones and skulls of victims. Much the same assertion was made by Paul Du Chaillu,¹ who saw a nest of this

monkey-eating eagle in the Gaboon between 1855 and 1865.

In spite of all my endeavours during my former and this last journey, I have been unable to kill the guanien, a most formidable eagle; but several times I have been startled in the forest by the sudden cry of anguish of a monkey who had been seized by this 'leopard of the air,' as the natives call it, and then saw the bird with its prey disappear out of sight.

One day, hunting through the thick jungle, I came to a spot covered with more than one hundred skulls of monkeys of different sizes. Some of these skulls must have been those of formidable animals, and these now and then succeeded, it appears, in giving such bites to this eagle that they disabled him. For a while I thought myself in the Valley of Golgotha. Then I saw at the top of a gigantic tree, at the foot of which were the skulls, the nest of the bird, but the young had flown away. I was told by the natives that the guanien comes and lays in the same nest year after year. When an adult specimen will be procured, it may be found to rival in size the condor of America.

Though he did not realize it, Du Chaillu had already secured a specimen of the eagle for the Academy of Natural Sciences in Philadelphia. The name he gave, "guanien," was surely not a native designation, but more likely meant for a French word derived from *guenon*. This passage well illustrates the usual truthfulness combined with literary color of Du Chaillu's observations. Messrs. Haagner and Ivy² have stated that on one occasion fifty-eight skulls of small antelopes and rock-rabbits were found beneath the South African nest mentioned above, but that in later years bones were seldom dropped there. In the present case I could find practically no bones beneath the tree; but since the nesting season was virtually at an end, it may be that the many animals roaming the forest floor had had time to carry off all such

¹1890, *Adventures in the Great Forest of Equatorial Africa and the Country of the Dwarfs*, pp. 246, 247.

²1923, *Sketches of South African Bird-Life*, 3rd Edition, p. 96.

refuse. Mongooses there are aplenty, and even a squirrel appreciates a bone to gnaw on.

It happened on this day that just while I was examining the ground at the base of the tree, where some low boughs impeded my view upward, a change in the voice of the eaglet warned me that something was going on. Before I could reach the lookout, Nekuma told me, an old eagle had come and gone. Its flight was so nearly noiseless as to escape my ear. This must serve the bird well in its hunting. The rounded form of the wings is what one might expect of a bird that pursues its prey through the dense foliage of a tropical forest. This time food was left on the nest, and the youngster sat there a long time. At twilight it settled down to roost on a horizontal limb, without further attention from its parents.

Arriving at 6:30 on the third morning, we found the young eagle alone on the nest, eating. Later on, as it sat in the tree, it would call frequently, surely not from hunger, and was continually twitching its head. Through my glass the reason was evident: six to a dozen insects of some sort were always buzzing about its mouth. Perhaps they were honeybees, like those which were making it uncomfortable for us on the ground. In these forests the bees are extremely fond of human perspiration, and love to crawl over one's face and hands. We had long since discovered that the ground where we sat swarmed with tiny brown ticks, which climbed all over us, hooking in securely on the tenderest spots of our skin. They were favored, as we were too, by three days without rain. Such a dry spell is none too common in the Ituri forest after January.

The third day was running its course. At about four o'clock the young eagle

had not returned to the nest, and I was reading an ancient London newspaper, or rather studying it—in order to make it last longer. Of a sudden I was aroused by the eaglet raising its voice excitedly, and jumped to my feet. The old bird had already reached the nest with a foreleg of a monkey, and was immediately joined by the young one. A glance through the glass showed me the adult, with tail toward me on the rim of the nest, taking a good look at me over its shoulder. My gazing was finished, and the muzzle of a Winchester returned the bird's stare. As bad luck would have it, my shot dropped the old eagle right on the nest, and before anything could be done twilight would be upon us again. Had there been any possibility of more prolonged observation, it would have been a great mistake to shoot; but the young bird was too old to serve as a good decoy. That very evening, in fact, it took its departure and was not seen again.

In my boyhood I was counted a good climber, but these African forest trees baffled me completely. Even with climbing irons I would have been helpless on any of the larger trunks. But the natives had better means, and the only way to get my bird was to enlist a skilled climber. Luck was with us now, for two of the elephant-trappers promised their services. Early the next morning they began by stepping into a thicket to get their "climbers." The stout green stems of some huge canna-like plants were twisted into a pair of short cables. These were looped so as to encircle the tree, and then the man's thigh or foot. Now for the ascent.

Two miles through the forest brought us again to the base of our tree; but this was so large, though not buttressed, that six feet above the ground

it was still twelve feet in circumference. Higher up it tapered only gradually. Poles had therefore to be lashed to the bole for a distance of ten yards before the loops for climbing could encircle it. One of the men then passed his right thigh into one ring, and with the left foot in the other, "hitched" his way up the smooth trunk, resting his weight alternately in one ring or the other as he lifted the opposite, free loop a little higher.

All went well until he reached a swelling of the trunk only a little below the nest and found it too large for the loops. So up went the second man with a rope of long creepers, to pull up more lashings and poles to be made fast against the trunk. From the ground I sternly urged the climbers to stick to their job—and secretly marveled at their perseverance. To shorten the story and to spare my readers the anxiety I felt that day, it may suffice to say that the assault began at 7 A.M. and my bird was not lowered from the tree until 11 o'clock. I find no record of how I rewarded my human squirrels, but they certainly received all they had stipulated, and more. Nekuma and I stood in admiration before the hard-won prize, an old female with a spread of some seventy inches, despite the relatively short, rounded form of the wings. We raised her crest, pulled open the stocky toes and hooked claws, and recalled how his people would have prized the large, black-banded quills.

On the top of the nest the only conspicuous remnants of food were a leg of a monkey, a bleached tibia of

another, and a few large pellets of fur, disgorged as owls would do. The size of these pellets was impressive. We had not been the first to shoot at a bird on this nest, and one of the climbers pulled an old arrow out of the bottom of it.

In the present tree no weavers had built nests, but while watching under it, I noted that small birds were continually feeding in its leafy crown, and that they showed not the slightest fear of the young eagle even when it called. It might be supposed, moreover, that monkeys would come to fear the vicinity of such a nest, yet we heard them frequently during our waiting. The black mangabey, *Cercocebus albigena*, called near by, and once we spied on a band of guenons composed of two common species, *Lasiopyga ascanius* and *denti*, going by through the trees about eighty yards off.

These eagles had shown the usual preference of large forest-nesting birds for a tree set off slightly from its fellows, which might thus be better protected from arboreal mammals. Yet they make monkeys their principal food, and are able easily to kill adult guenons with their powerful feet and talons, the largest claw reaching a length of $3\frac{1}{2}$ inches. When the young eagle sat on a bough, its most prominent features were the enormous legs and the long tail. The young bird of which photographs are shown was not fully grown, hence the shorter tail. I did not see the crest raised, but Lang tells me that in the adults brought to him alive the crest was erected so that there remained



Sketch to illustrate the method of climbing a large forest tree

a strong dip or gap in the middle, the long feathers at each side of the occiput standing somewhat higher.

Strangely enough, I cannot state positively the number of eggs usually laid by the subjects of my tale. In South Africa it is said that there may be as many as four. I am sure this is not the case in the Congo, but whether one or two is the usual brood still remains somewhat doubtful. We do know from a specimen in the British Museum that the egg is dull white, measuring close to three inches in length and about two and one-eighth in its short diameter. Young nestlings, secured by Lang, show that when first hatched they are densely clothed in pure-white, cottony down.

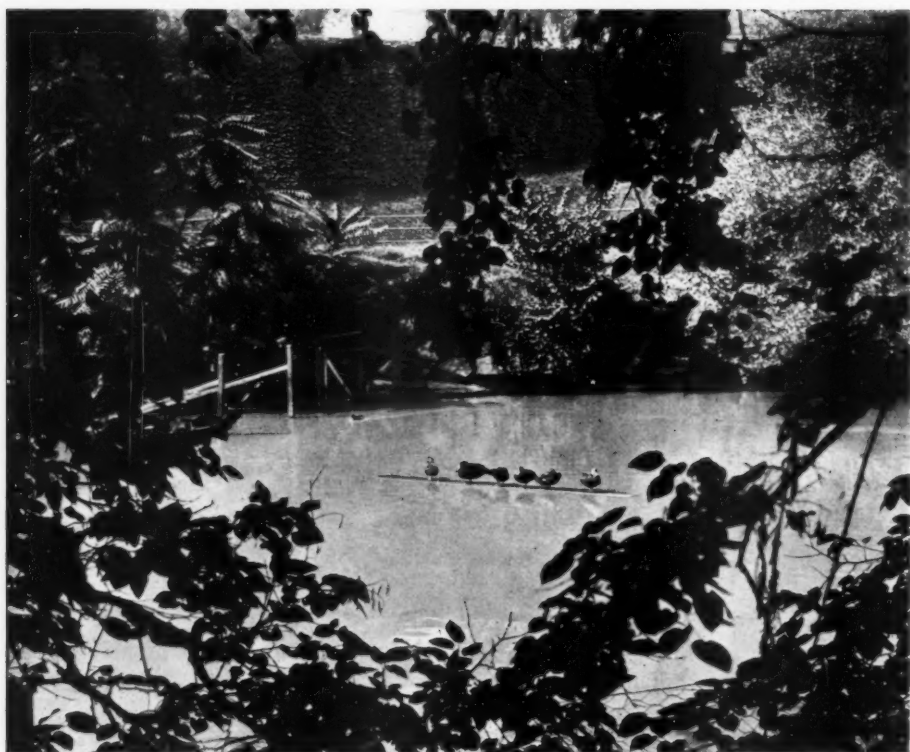
In South Africa, naturally enough, *Stephanoaëtus coronatus* preys largely on small antelopes; and it seems equally fitting that in the Congo forests it should be primarily a monkey-eater, as shown by our examinations of crop and stomach in eight cases. Five of the birds had been eating monkeys of the genera *Colobus* ("guerezas") and *Lasiopyga* ("guenons"). In four instances the bones showed that the monkeys were immature, but one was a fully adult *Lasiopyga*. Other prey is not disdained, for the forelimb of a mongoose and the remains of two birds were taken from the three remaining eagles. Mr. G. L. Bates in the Cameroon has recorded the eating of a hyrax (*Procavia dorsalis*) and an attack upon *Lasiopyga cephus*.

The man who got my eagle down from the tree related that once he had come upon a crowned eagle on the ground with a monkey it had slain. Setting a trap he secured the bird when it returned to its kill. There can be little doubt that such large prey, captured in the trees, is regularly borne to earth

to be torn asunder and then carried off in parts. Less than two months after shooting my specimen, I received another from a black hunter who had surprised it with a dead monkey on the ground. It flew up into a tree and was brought down with an arrow.

In the meantime my helper Nekuma had settled the identity of the weaver that nests near the aeries. He was sent to look up another nest of the eagle reported by natives near Avakubi, but found it already abandoned. It was in a high tree, and near it there hung about twenty weavers' nests whose owners had not left. Specimens secured by Nekuma proved to be *Malimbus erythrogaster*, a brilliant scarlet-and-black species, of which I had found a single pair the year before, weaving a new nursery in a tree where there was already a nest of the great blue plan-tain-eater (*Corythaeola cristata*). Some four years earlier near Medje I had found nests of the same weaver in trees unoccupied by any large bird, so they seemed to seize the protection when available, but were not wholly dependent upon it. It may be added that another kind of weaver in the grasslands of the northern Congo nests near the homes of buzzards, vultures, or marabou storks; along the Congo River I found some also building under the jealous eye of *Gypohierax*, a vulturine bird of prey.

Not long ago I revisited the Antwerp zoölogical gardens, and there saw an adult crowned eagle perched sedately in its cage, surveying me with its cruel yellowish eyes. My pulse must have quickened as I paid my respects to an old and esteemed friend from the Congo—it doubtless came from there—and I longed to be standing again under Africa's giant trees with my veteran binocular fixed on this notable bird in its haunts.



Black ducks on one of the smaller ponds. They are descended from wild birds

Bird-hunting in Central Park

By LUDLOW GRISCOM

Assistant Curator

FEW people without experience, would suppose that a park in the heart of a great city was an excellent station for the study of birds during the migration period. Bradford Torrey, years ago, used to tell the story of a friend who inquired of a distinguished ornithologist where he should go to obtain a sight of certain rare warblers. Much to his surprise, the advice was, "Go to Central Park, New York," though an undistinguished friend had already recommended precisely the same place! The writer has visited the Ramble in Central Park daily in spring and fall during the past eighteen years and can fully endorse the excellence of

this advice. It is, indeed, an ideal place for a close study of migration. The reason is comparatively simple. The greater number of our local birds migrate at night. The electric lights of the city have a certain fascination for these little travelers, just as lighthouses are well known to have, and they fly lower, particularly on foggy nights. Secondly, the Park is a haven of refuge, a veritable oasis in a vast desert of city roofs. As day breaks, the tired hosts must alight to rest and eat. How gloomy those individuals must feel who see nothing but the roofs of Newark or Hoboken beneath them by the dawn's early light, and how inviting the lakes,

lawns, and verdure of the Park must seem in the distance. Many indeed are forced by fatigue to alight almost anywhere. Washington Square has a notable list of birds, and a friend has recorded more than thirty species in a back yard on Tenth Street, which boasts one sickly little tree, surrounded on all sides by tall apartment houses. Anyone who stands on the bridge over the lake in Central Park at daybreak on a warm May morning will be able to appreciate for himself the force of this attraction. Calls of various species can be heard showering out of the blackness of the night in every quarter of the sky. As day breaks it is obvious that the birds are flying lower and lower, then they become dimly visible, less than a hundred feet overhead, and finally they can be seen pitching into the nearest trees. During the next half hour the chorus of song gradually swells as the travelers find food and rest, and the observer can set about recording the extent of the flight, and the new species which have arrived from the south. It also follows, parenthetically, that once having alighted, there is no special inducement to move on, as there is no suitable adjoining territory to go to. The smaller birds at least are caught until nightfall at the earliest, or until the instinct of migration inspires them to proceed another lap on the return journey to their breeding grounds. It frequently happens, therefore, that individuals of rare or uncommon species will remain for several days, or even a week, and give the student a real opportunity to cement a chance acquaintance.

It must not be supposed, however, that Central Park is an Eden for all the species of birds in the New York City region. The causes which attract night-flying birds do not apply, for

instance, to those which migrate by day, and their one desire is to leave the dust and noise of the city behind them as rapidly as possible. As there are no marshes or feeding grounds for water birds, these are of purely casual occurrence. Similarly the absence of grassy fields and pastures deprives the park of any attraction for birds like meadow larks and vesper sparrows, which consequently are very rare. Few indeed are the birds which can endure the noise of the summer crowds, and the breeding species are steadily decreasing. Very few species now spend the winter unless a feeding station is started early enough in the fall and consistently maintained, as in late October the ground is carefully raked over and the shrubbery is trimmed to insure a good growth the next season. But these operations inevitably destroy part of the food supply and eliminate shelter and cover, so that the Park has no attractions as a winter resort. But the Park does offer a suitable habitat to the great majority of woodland and thicket-loving species which migrate by night, and they are as common, or even more common, than anywhere in the vicinity of the city.

Some figures might be of interest. Fifty years ago, when the park was on the outskirts of the city, nearly sixty species nested and many were common all winter. In 1908, eighteen species nested and twenty-two spent the winter. Last year, but eight species nested and a very few individuals of three native species spent the winter. This decrease was inevitable and was to have been expected, though bird lovers regret the disappearance of the cardinal and warbling vireo, and miss the friendly chickadees which used to snatch peanuts from between their lips in the winter time. The regular tran-



Photographed by Edmund O. Hovey

THE LAKE FROM THE RAMBLE

Swallows skim over its surface, the kingfisher watches in the overhanging trees, and the water-thrush trips along the bank

sient species have not been affected, however, and a daily visit from April 1 to May 30, and from August 10 to the end of October is certain to repay the student. The average list for such a series of visits is about 110 species per year. At the end of this article will be found a list of all the birds recorded from the Park, divided into two categories, (a) those of more or less regular or normal occurrence (116), and (b) those of very rare or casual occurrence (75). What usually happens is that some of the species belonging in list *a* are missed in any given year, and these are compensated for to a certain extent by two or three species belonging in list *b*. May is the star month, when the maximum number of species and individuals is present. There is always the possibility that a great "wave" of migrants will arrive overnight with favorable weather conditions. Such an occasion took place on May 10, 1922, when 66 species and thousands of individuals were observed in the Ramble. This is the record, but fifty species at least can usually be counted on, one or two days each season. Conditions are somewhat different in the fall, when the migration is protracted over a far longer period, and the birds move south in a more leisurely manner. The record list in fall is only 52 species on October 4, 1907, when a sudden cold snap, after a mild September, forced many laggards to rush south pell-mell. Indeed, it is exceptional to record more than 40 species in any one day. When we consider the absence of song and the change to a more obscure plumage, it is small wonder that the average bird lover is discouraged, and the swarm of observers in May is conspicuously absent in fall. Nevertheless, at least twenty-five of the rarer species are far more likely to be seen in fall than in

spring, and a few are beyond the bounds of reasonable hope in May. During the past eighteen years, the writer has seen 160 out of the 191 species recorded since 1875.

How do these figures compare with the country outside the city limits? They are, of course, very much lower. If Sunday and holiday trips are intelligently planned, it is quite possible to see 225 species in a year in this vicinity, and I have seen 280 species in all, in the same eighteen-year period. A good May-day list will exceed 100 species and a good day in fall will yield 70 species or better. Why then, it may be asked, go to Central Park, where the variety is so small and the number of species so relatively few. The main answer has already been given. More of the rarer transients will be found in Central Park during May than anywhere else. There is another purely practical reason. The average dweller in Manhattan can only look for birds in the country on Sundays, and on week days it is Central Park or nothing. When we consider that only one or two individuals of the rarer species will occur a season, the chances against their being obliging enough to be present on a Sunday are at least seven to one. These two factors combined demonstrate excellently the advisability of visiting the Ramble at least six mornings a week. Next to Central Park the best place for warblers in this region is Englewood, where I have been going every Sunday during May, year after year. I have seen the Cape May warbler there only six times in twelve years, and the mourning warbler never. In Central Park during the same period I have seen the Cape May warbler more than twenty times, and the mourning warbler twice. But it is a general law of life that it is almost impossible to get



A splendid covert for warblers, thrushes, and sparrows. The swans are a domesticated European variety

something for nothing. Hunting rare warblers in Central Park is no exception to this rule. He who, yawning portentously, lurches into the Ramble two or three times before breakfast some May, expecting to see all the rare transients, will be very rapidly and completely undeceived. The prizes come only to the energetic and the persistent, and what is fairly earned is the more thoroughly enjoyed.

Bird lovers may be divided roughly into three classes. The beginner, to whom all species are new and strange, is advised to begin in Central Park. The difficulties of identification are greatly reduced, when the number of possible species is also greatly reduced. With a hundred species learned the country outside will yield its greater wealth of

treasures with less confusion and fewer errors. The next stage in progress is marked by the desire to wander farther afield and gain an acquaintance with as many species as possible, and field trips to special places are undertaken with the main hope of seeing some new rarity, or obtaining a large list. This stage is a necessary and valuable experience, and must be passed before the amateur ornithologist really becomes capable of contributing to local ornithology. The Park has little appeal for such people. But when the making of large lists palls, and the chances of seeing a new species locally have become exceedingly remote, the opportunities of the Park as a station for studying that most fascinating phenomenon, the migration of birds, is urged

upon those desiring to make something constructive out of their hobby. Every individual bird can be determined with certainty as a transient, or can be definitely known not to be one, something which is utterly impossible in the country, where there are large numbers of permanent, summer, or winter residents to obscure the issue. Consequently the migration periods of species which nest in this vicinity or which are found throughout the year can be determined with more certainty in the Park.

But there is also an element of sport and enjoyment which no account of bird-hunting in a city park should omit. After all, the satisfaction to be derived from a given course of action is directly in proportion to the expectation preceding it. It is possible to see one hundred species in a day in winter in southern California, and it is practically impossible to see more than forty in the vicinity of New York. Yet I never heard of a local bird lover who abandoned his observations during the winter on the ground that bird life was comparatively meager, or who failed to be delighted at seeing thirty species. His expectations were reasonable and controlled by the known facts. The same philosophy can be applied to advantage in Central Park, and many delightful week-day hours each spring and fall are shared by a band of fellow enthusiasts and friendly rivals. We are as pleased with fifty species in the Ramble as we would be with one hundred in the country. There the crow is utterly despised and ignored; here it is a rare visitor to be greeted with enthusiasm. The morning hours are as cool, the songs are just as sweet.

And then one can never tell exactly what is going to happen next. No two spring or fall seasons are exactly alike.

There are lean years like 1924, and very good years like May, 1925, when birds were present almost daily in unusual variety and abundance. There are lean days when almost nothing can be found, and good days, when the Ramble is crowded with multitudes. We have never yet learned how to predict a big flight with absolute certainty. They fail to materialize when the weather conditions seem just right, or they arrive quite unexpectedly. One can never tell just which ones of the rarer species will appear, or when. Once in a great while there are the red-letter days when some bird of extraordinary rarity is detected. I well remember the glowing orange prothonotary warbler which was detected on the "Point" in the lake on May 3, 1908, a wanderer from the cypress swamps of the south. It remained a whole week, sang freely and was absurdly tame, so that it could literally be surrounded by enthusiastic nature study classes, without turning a hair, or more correctly, ruffling a feather. Quite a number of people began to study birds, thanks to the general atmosphere of excitement over this warbler.

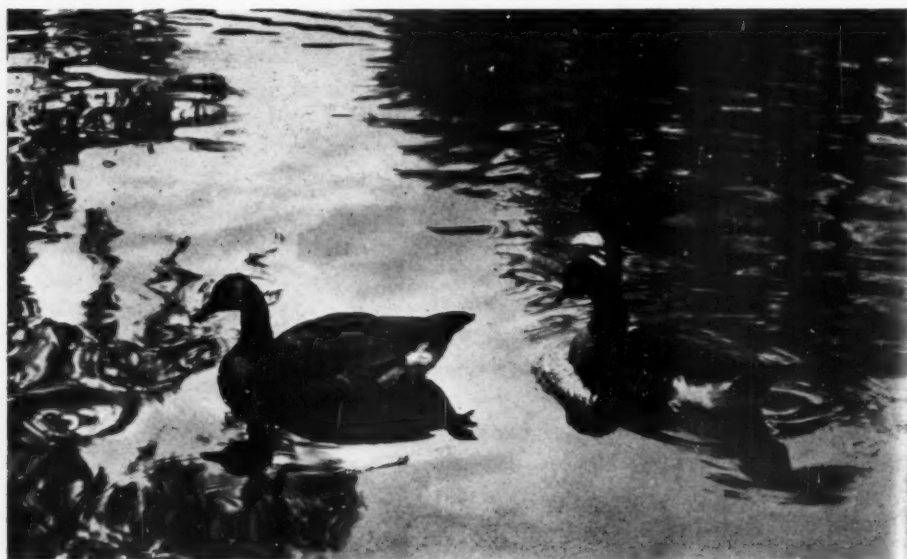
Surprising as it may seem for so small an area, nobody ever saw all the species present in the Ramble on any one day, when birds were at all common. The writer, among others, has made repeated and earnest endeavors, but has never succeeded. One pair of eyes cannot hope to equal the combined results of ten or twenty other pairs, as keen or even keener. The following incident is a generalized picture of this state of affairs. I have spent two hours in the Ramble before breakfast entirely alone, and have had a very successful morning. Several new species have arrived over night and one or two rarities have

fallen to my glasses. I return at noon knowing that a group of sharp-eyed friends have spent the entire morning in the Ramble, and I wish to check up on the extent of the flight. We meet and compare notes. I find that they have not seen one or two of my best discoveries. I listen with a certain discreditable satisfaction to their yelps of disappointment, but the situation is immediately reversed, as they reel off so long a string of species, that it seems almost incredible that anyone really interested could have overlooked all of them. Sometimes we scatter in a frantic search for the species missing on our respective lists. Again, if nothing of special note has been reported, we combine forces and go around together. This nearly always results in the discovery of a third group of species, which nobody had seen previously.

I cannot forbear to say a few words in closing about the bird hunter, in relation to his environment, as well as the

birds, and more particularly respecting his relations with his fellow citizens, who use the Park for other purposes. It makes me happy to report that in the last twenty years we have gradually become more sane and normal, and we are now almost like ordinary people. Nowadays everybody understands what the bird hunter is about, and is tolerant, or even sympathetic. People will now often stop and ask intelligent questions, or they will try and see the bird for themselves, and even the Park policeman is becoming an enthusiast, the hours on his beat passing more pleasantly than before.

So I can the more cheerfully recommend pleasant and instructive hours of fresh air to city dwellers. Doctors are now advising overworked and nervously fatigued patients to study birds in Central Park. It is a healthy hobby, and with a little skill and experience, the time spent on it can be made of constructive scientific value. The lists



Canada geese on the Park lake. They are domesticated birds but perfectly able to fly, resulting in numerous reports of wild geese alighting in the Park. Real wild geese are seen about once in ten years flying over at a great height

at the end of this article give a good idea of the possibilities as regards the variety of species. With modifications depending upon the size of the Park and the extent to which its grounds imitate the country, these lists apply fairly well to any park in the northeastern states. The more general reasons for the excellence of a park as an aviary for migratory birds hold true for every city in the United States. The reader is cordially invited to make the experiment for himself.

ANNOTATED LIST OF THE BIRDS OF CENTRAL PARK

A.—Species of Regular or Normal Occurrence (116)

- Pied-billed Grebe.—Rare on the park lakes, chiefly in April and October.
Herring Gull.—Common in winter on the reservoirs.
Black Duck.—Descendants of wild birds are resident on the lakes.
Green Heron.—Uncommon, but regular in May, August, and September.
Night Heron.—Seen annually between late April and October.
Solitary Sandpiper.—Rare in May, August, and September.
Spotted Sandpiper.—Common around the lakes and reservoirs in May and August.
Sharp-shinned Hawk.—Every year in late spring and early fall.
Duck Hawk.—A possibility throughout the year on pigeon hunting excursions.
Pigeon Hawk.—Recorded almost every year in late April or early May.
Sparrow Hawk.—Found throughout the year.
Fish Hawk.—Recorded almost every year, chiefly in May.
Screech Owl.—Several resident pairs.
Yellow-billed Cuckoo.—Once or twice a year in late May or early fall.
Black-billed Cuckoo.—Once or twice a year in late May or early fall.
Kingfisher.—Common around the lakes, chiefly in May and August.
Hair Woodpecker.—Rare in fall, sometimes spending the winter.
Downy Woodpecker.—Permanent resident.
Sapsucker.—Uncommon in spring (April); common late September and early October.
Red-headed Woodpecker.—Rare in May and September.
Flicker.—Common summer resident.
Whippoorwill.—Occasionally found in May.
Nighthawk.—Common all summer, roosting on dead branches.
Swift.—Common all summer.
Hummingbird.—Seen every year in late May and August.
Kingbird.—Seen every year in May and August.
Crested Flycatcher.—Seen every year in May and August.
Phoebe.—Common in early spring and late fall.
Olive-sided Flycatcher.—Rare in late May and August.
Wood Pewee.—Regular in May and early September; one or two pairs breed.
Yellow-bellied Flycatcher.—Every year in late May and August.
Least Flycatcher.—Common in May and August.
Blue Jay.—Uncommon in early May and October.
Crow.—Occurs every year, chiefly in late April and August.
Fish Crow.—Occurs nearly every year, chiefly in May and August.
Starling.—Common permanent resident.
Red-winged Blackbird.—Seen every year in spring and fall.
Baltimore Oriole.—Regular summer resident.
Rusty Blackbird.—Seen annually in April or May, sometimes in October.
Purple Grackle.—Common summer resident, late February to November.
Bronzed Grackle.—Occasional in early spring or late fall.
House Sparrow.—Common permanent resident.
Purple Finch.—Uncommon in spring, common in fall.
Goldfinch.—Common both spring and fall.
Pine Siskin.—Irregular, chiefly in May and October.
Savannah Sparrow.—A few nearly every spring and fall.
White-crowned Sparrow.—Seen nearly every year in May or October.
White-throated Sparrow.—Very common both spring and fall, sometimes wintering.
Chipping sparrow.—Regular in April and October.
Field sparrow.—Common both spring and fall.
Junco.—Abundant on migration, sometimes wintering.

- Song Sparrow.—Common on migration; sometimes nesting and wintering.
- Lincoln's Sparrow.—Seen every year in May.
- Swamp Sparrow.—Common both spring and fall.
- Fox Sparrow.—Usually common in early spring and late fall.
- Towhee.—Very common, spring and fall.
- Rose-breasted Grosbeak.—Common in May, rare in fall.
- Indigo Bunting.—Regular in late May, rare in fall.
- Scarlet Tanager.—Common every spring and fall.
- Barn Swallow.—Common both spring and fall.
- Tree Swallow.—Seen every spring; common in August.
- Bank Swallow.—Seen nearly every year in May.
- Cedar Waxwing.—Irregular in spring, often common in fall.
- Red-eyed Vireo.—A few pairs nest; common on migration in May and September.
- Yellow-throated Vireo.—About one a year in May.
- Solitary Vireo.—Common both spring and fall.
- White-eyed Vireo.—Uncommon in May.
- Black and White Warbler.—Abundant in May, August and September.
- Worm-eating Warbler.—Seen almost every year in May and August.
- Blue-winged Warbler.—Uncommon May, common August.
- Golden-winged Warbler.—Rare in May and August.
- Nashville Warbler.—Common in May and September.
- Tennessee Warbler.—Irregular in May; common in August and September.
- Parula Warbler.—Abundant in May, common in fall.
- Cape May Warbler.—Seen annually in May, August and September in varying numbers.
- Yellow Warbler.—Common in May and August, a pair usually nesting.
- Black-throated Blue Warbler.—Common both spring and fall.
- Myrtle Warbler.—Abundant both spring and fall.
- Magnolia Warbler.—Very common in May, common in early fall.
- Chestnut-sided Warbler.—Common in May and early September.
- Bay-breasted Warbler.—Common in late May and August.
- Blackpoll Warbler.—Common in May, abundant in fall.
- Blackburnian Warbler.—Common in May, uncommon in early fall.
- Black-throated Green Warbler.—Abundant in May, common in fall.
- Pine Warbler.—Common in April; very rare in fall.
- Palm Warbler.—Rare in spring, regular in fall.
- Yellow Palm Warbler.—Common both spring and fall.
- Prairie Warbler.—Common in May and September.
- Ovenbird.—Abundant in May, rare in fall.
- Water Thrush.—Common in May, August and September.
- Louisiana Water-thrush.—Rare both spring and fall.
- Mourning Warbler.—Rare in May and August.
- Maryland Yellow Throat.—Abundant both spring and fall.
- Yellow-breasted Chat.—Seen every year in May; very rare in fall.
- Hooded Warbler.—Uncommon in May and August.
- Wilson's Warbler.—Common in late May, rare in fall.
- Canadian Warbler.—Very common in May, August and September.
- Redstart.—Abundant both spring and fall.
- Catbird.—Very common both spring and fall.
- Brown Thrasher.—Very common both spring and fall.
- House Wren.—Seen every spring in late April and May; rare in fall.
- Winter Wren.—Rare in May and October.
- Brown Creeper.—Common both spring and fall.
- White-breasted Nuthatch.—Uncommon in fall, rare in spring.
- Red-breasted Nuthatch.—Irregularly common in fall, rare in spring.
- Chickadee.—Uncommon in October, sometimes wintering.
- Golden-crowned Kinglet.—Uncommon in April, common in October.
- Ruby-crowned Kinglet.—Very common both spring and fall.
- Gnatcatcher.—Rare in spring, very rare in fall.
- Wood Thrush.—Seen annually in May, and sometimes in fall.
- Veery.—Fairly common in May, rare in fall.
- Gray-cheeked Thrush.—Common in May and September.
- Olive-backed Thrush.—Very common in May and September.

Hermit-thrush.—Common in April, early May and October.

Robin.—Common summer resident.

Bluebird.—Uncommon in early spring and late fall.

B.—Species of Very Rare or Casual Occurrence (75)

Holboell's Grebe.—Casual on the reservoir; twice.

Horned Grebe.—Casual on the reservoir; three times.

Loon.—Occasionally noted flying over; once on the reservoir.

Iceland Gull.—Once on the reservoir in winter.

Great Black-backed Gull.—Once on the reservoir in winter.

Laughing Gull.—Casual on the reservoir in late summer.

Common Tern.—Once in late summer.

American Merganser.—Four winter records on the reservoir.

Red-breasted Merganser.—Twice on the reservoir, April and October.

Hooded Merganser.—Once in late November.

Green-winged Teal.—Once in fall.

Wood Duck.—Formerly rare in spring and fall; only one record in the last ten years.

Redhead.—Casual; once.

Scap Duck.—Casual; twice.

Ruddy Duck.—Casual; twice.

Canada Goose.—Tame birds are resident; wild birds on migration are seen flying over about once every ten years.

American Bittern.—Very rare in spring; five records.

Great Blue Heron.—Casual; three times.

Coot.—Once many years ago.

Woodcock.—Now casual; three times in the last twenty-five years.

Least Sandpiper.—Once in May.

Greater Yellowlegs.—Twice.

Killdeer.—Once many years ago.

Bob-white.—Formerly resident; long since extirpated.

Ruffed Grouse.—Formerly resident; long since extirpated.

Mourning Dove.—Very rare on migration.

Turkey Vulture.—Once.

Marsh Hawk.—Casual; no record in twenty years.

Cooper's Hawk.—Very rare; five times in past eighteen years.

Red-tailed Hawk.—Casual, no recent records,

Red-shouldered Hawk.—Casual, no recent records.

Broad-winged Hawk.—Very rare, only once in past twelve years.

Rough-legged Hawk.—Once.

Bald Eagle.—Twice.

Long-eared Owl.—Four times in winter.

Barred Owl.—Formerly resident; extirpated years ago.

Saw-whet Owl.—Three times in winter.

Snowy Owl.—Once in winter.

Red-bellied Woodpecker.—Once.

Acadian Flycatcher.—Rarely identified in spring.

Alder Flycatcher.—Rarely identified in spring.

Bobolink.—Very rare in May and August.

Cowbird.—Very rare in April and October.

Meadowlark.—Casual.

Orchard Oriole.—Very rare in May.

Pine Grosbeak.—Two winter records.

American Crossbill.—Very rare and erratic visitant.

White-winged Crossbill.—Twice in winter.

Redpoll.—Very rare and irregular in winter.

Snowflake.—Twice in winter.

Vesper Sparrow.—Casual; twice in last twenty years.

Grasshopper Sparrow.—Once.

Seaside Sparrow.—Once.

Tree Sparrow.—Very rare in winter.

Cardinal.—Formerly resident, now extirpated.

Dickcissel.—Once.

Purple Martin.—Only five records.

Cliff Swallow.—About once in five years in May.

Rough-winged Swallow.—Once.

Northern Shrike.—Very rare in winter.

Migrant Shrike.—Once.

Philadelphia Vireo.—Twice in September.

Warbling Vireo.—Now very rare in May.

Prothonotary Warbler.—Three records in spring.

Orange-crowned Warbler.—Once in September.

Cerulean Warbler.—Once in May, once in September.

Yellow-throated Warbler.—Once in spring.

Kentucky Warbler.—Very rare in May.

Connecticut Warbler.—Twice in May; four times in September.

Pipit.—Casual on migration; four records.

Mockingbird.—Casual; five times.

Carolina Wren.—Rare and irregular visitant.

Long-billed Marsh Wren.—Three times in May.

Tufted Titmouse.—Once in May.

The European Starling as an American Citizen

By FRANK M. CHAPMAN

Curator

THE American Museum may claim the doubtful honor of being the birthplace of the first European starlings to be born in this country. It was soon after their release in Central Park in 1890 that William Richardson, then of the department of taxidermy, found a starling's nest under the eaves at the northeast corner of the north wing.

Since that date, the Museum has extended its area from Columbus Avenue to the park, but in the same period the starling has extended its range, locally, from Montreal to Florida and Ohio. The one hundred birds freed in 1890 and 1891 now have millions of descendants. The starling has come to stay. Nature has accorded him his "papers" and he exercises all the privileges of citizenship.

It is a singular thing that both the starling and English sparrow were introduced into New York City by the same person. Impressed by the abundance of birds in England and by what he believed to be their comparative scarcity in this country, Eugene Schieffelin determined to make good the deficiency.

Inspired by the highest motives, he might, under proper direction, have become the father of bird conservation in America and have saved for us species we shall never see in life again. But like many another pioneer reformer, he blazed a false trail. Organizing and incorporating at Albany a society for the importation of foreign birds into New York State, he followed the introduction of the house sparrow with that of song thrushes, chaffinches,

bullfinches, skylarks, nightingales, and finally the starling. Only the first and last of his attempts to transplant European birds to our shores were successful and in them he took no small amount of pride. Often, after the release of the starlings, he came to the bird department to ask whether any had been seen recently, and he was particularly pleased when he learned that a pair had nested in the building.

These observations, made immediately following the introduction of the starling, when its future in this country was still uncertain, recall the experiences of an earlier generation of ornithologists who, with equal interest, reported seeing English sparrows! I quote from the annals of the *New York Lyceum* for 1867, page 287, where George N. Lawrence wrote:

This familiar European species has been successfully introduced in New York, and colonies have been established at several distant points, where they could have been seen during the past winter. After the extreme cold of last January (1866), when the thermometer marked ten degrees below zero, I noticed them in their usual quarters, apparently unharmed. In Jersey City, also, they are quite numerous. I first observed them in the spring of 1865. A friend, conversant with our local native birds, informed me that he had seen a species in the shrubbery around the church on the corner of 5th avenue and 29th street, with which he was not familiar; on going to ascertain what they were, to my surprise I found them to be house sparrows; they were domiciled in the ivy which grew on the walls of the church, and were quite gentle and fearless, some alighting in the street and dusting themselves quite near to where I stood. I afterwards learned from our associate, Mr. Eugene Schieffelin, that he had been looking after them with much interest; in fact he is entitled to the credit, in a great



STARLING
(Courtesy National Association of Audubon Societies)

UNIT
OF
WICH

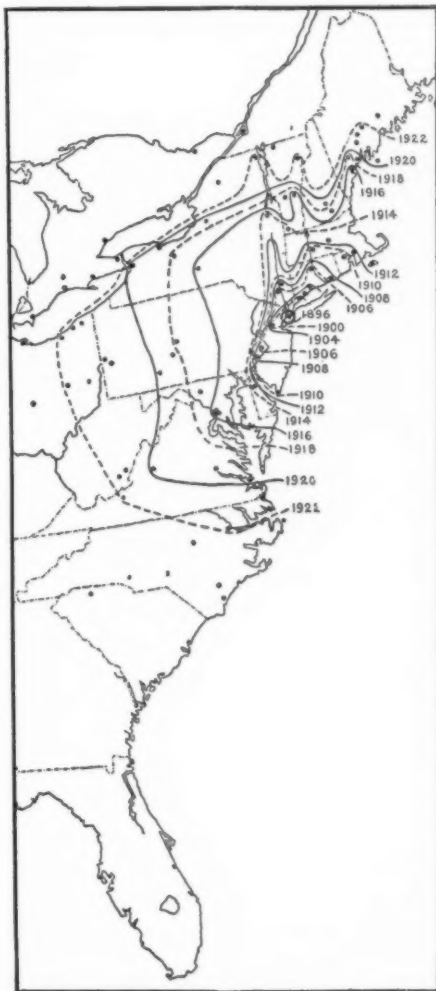
measure, for this important acquisition to our city. In 1860, and for three years thereafter, he yearly set free five or six pairs, mostly in the neighborhood of Madison Square; seven pairs were let out in the Central Park by the Commissioners, in 1864.

After becoming thoroughly established in the upper part of New York City, the starling began the campaign for the acquisition of territory which is still in progress. Following shore lines it spread north, east, and south, and within ten years appeared at Ossining, New Haven, and Bayonne. Another ten years saw it near Providence and Philadelphia and in 1920 it was known from Maine to Virginia.

Having colonized the coastal region, like other emigrants from over seas, it began to penetrate the interior. It reached Ithaca, New York, in 1916, and the same year was found at West Lafayette, Ohio, the first known appearance of the species west of the Alleghenies.¹

The Plains, the Rockies, and the Sierras will probably prove obstacles in the starling's course, but no doubt he will surmount them and sooner or later establish himself throughout the greater part of the country.

During the thirty odd years of the starlings' residence in America, none of our native land birds has appreciably increased in numbers. How, then, has the starling, starting from a few pairs, become more abundant than many of them? In attempting to answer this question we discover some of the factors governing the comparative abundance of species. In the first place, it is evident that the starling has filled a place (technically, an "ecological niche") not occupied by a native species. Without in any way



Breeding range of the European starling in eastern North America. Areas successively covered in two-year periods shown by alternating broken and continuous lines. Spots outside the 1922 line indicate isolated records, mainly in winter. From Dept. Circular 336. U. S. Dept. Agr.

disparaging the American Museum as a home for birds, indeed we always welcome them, what American bird, left to its own resources in Central Park, would have reared a family under our eaves? The European house sparrow (which we insist on miscalling the "English" sparrow) could and does, and like the starling it has succeeded. It is this ability to adapt themselves to circumstances which, primarily, has

¹See "Spread of the European starling in North America" by May Thatcher Cooke, Department Circular 336, U. S. Department of Agriculture, Washington, D. C. 1925.

enabled these aliens to survive and flourish in America. Again, like the sparrow, the starling is hardy and non-migratory. This means that he can withstand wide climatic variations and, in default of an inherited habit which would lead him over routes followed by our birds, that he runs no risk of flying out to sea, or to some other place whence he might never return. It is true he wanders about after the nesting season, but his movements are largely governed by a search for food and, probably do not carry him far from his nesting place.

When, therefore, he does have to compete with flickers, or bluebirds, or other hole-nesting species, for a home, he is generally first to arrive and the nine-points of possession are usually in his favor. Moreover, he is pugnacious and not averse to asserting his rights. Also, he is prolific, raising, as a rule, two broods, of which, because of the protective character of the nest-site and defensive ability of the parents, a comparatively large percentage doubtless reach maturity. Need of only limited territory when nesting is also presumably responsible for the starling's rapid increase. In some birds sexual jealousy is so highly developed during the season of reproduction that they will not permit another pair of their own species to nest near them. But, I have recently heard of five pairs of starlings nesting simultaneously in the hollow limbs of a single willow tree. Add to these various traits, omnivorousness in feeding habits, and we have some of the reasons why the starling has multiplied and spread.

Having with thoughtless hospitality accorded the starling, house sparrow, San José scale, gypsy moth, and other pests, including certain members of the genus *Homo*, free and unchallenged

entry to our ports, we now ask (if to our sorrow, we have not already learned), "Are they desirable?" So far as the starling is concerned the question is not to be answered in a word. It can, however, be answered for we have to thank American economic ornithologists for the most exhaustive study of the starling's food habits which have as yet been made.

The first of these, by Edward Howe Forbush, State Ornithologist of Massachusetts, coöperating with the Biological Survey, was published by the State of Massachusetts in 1915;¹ the second, by E. R. Kalmbach and I. N. Gabrielson, was published by the Biological Survey in 1921;² I quote here from the latter. The conclusions therein presented are based on the work of Forbush as well as on much original research including the analysis of the contents of 2466 "well-filled" stomachs and detailed observations of the bird in nature.

The starling is here considered under three counts: (1) its food habits, (2) its relation to other species, (3) its direct relation to man. The study of the starling's food has been conducted with great thoroughness and the results reached doubtless adequately express the bird's economic status at this period of its American history. They are summarized as follows:

As an effective destroyer of terrestrial insects, including such pests as cutworms, grasshoppers, and weevils, the starling has few equals among the bird population of the northeastern United States.

The most serious objection to the starling on economic grounds arises from its destruction of cherries. When its work is combined with that of the robin, which is fully as destructive and much less easily frightened, the chances for a successful crop of cherries, especially of early varieties, are poor.

¹Circular No. 45, State Board of Agriculture, Boston. 8vo. 23 pages.

²Bull. No. 868. U. S. Dept. of Agriculture. 8vo. 67 pp.

The starling's work on apples is confined largely to isolated trees and to small, old orchards. Late varieties suffer more than those which mature at a time when there is still a great abundance of wild black cherries available. In the aggregate the apple damage is not great and is practically absent in young, well kept, productive orchards. Injury to peaches and pears is negligible, and the damage to grapes is at present confined to small arbors—the large vineyards suffering very little. . . .

results. The decidedly beneficial character of the food habits of one, two, or sometimes three broods of nestlings, numbering 4 to 6 to the nest, adds materially to the favorable economic status of the species.

The starling's competition with American birds is largely restricted to those that nest in holes and similar sites. This includes chiefly the blue-bird and flicker. The former is no

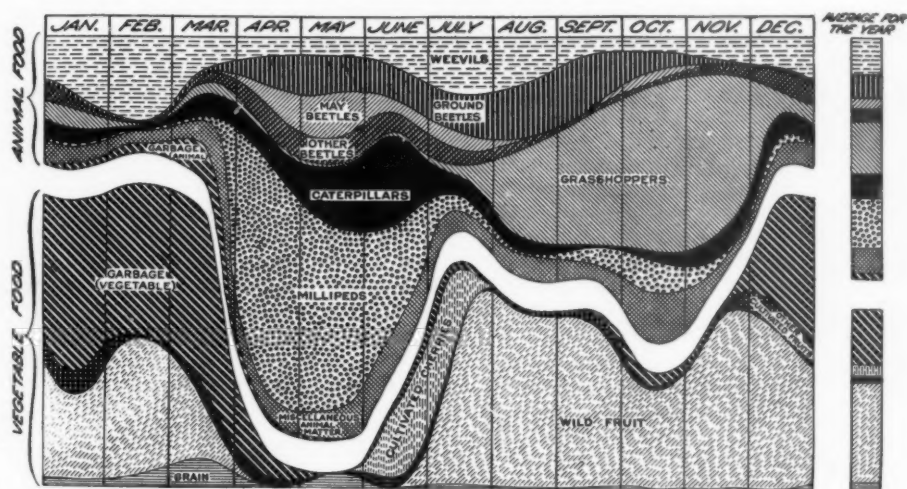


Chart of food of 2157 adult starlings, showing the varying quantities of the principal items from month to month, and the relative monthly average of each item. From Bulletin 868, U. S. Dept. of Agriculture

In the small city or suburban garden the starling's fondness for green stuff in spring and early summer has been the cause of some complaint, but in large truck-crop sections where the bulk of such produce is raised, the aggregate loss is trivial.

An idea of the economic significance of the starling's food habits is gained by comparison with the food habits of certain well-known native birds, with some of which it frequently associates. A thorough consideration of the evidence at hand indicates that, based on food habits, the adult starling is the economic superior of the robin, catbird, flicker, red-winged blackbird, or grackle. It is primarily a feeder on insects and wild fruit—less than 6 per cent of its yearly food being secured from cultivated crops. What damage it does inflict is due not so much to the character of its food habits as to the fact that the flocking habit has allowed some minor trait to be emphasized to a point where local damage

match for the relentlessly persistent alien and even the flicker's larger size does not always prevail against the starling's aggressive tenacity.

Conflict over the food supply is negligible in summer, but serious in the autumn and winter. For example, a dogwood bearing a crop of berries sufficient to supply a group of gentlemanly hermit thrushes with food for a fortnight will be stripped by a flock of starlings in a day. As a result, the thrushes continue their migration southward to winter beyond the present range of the starling. But it is apparently only a question of time when the starling will be abundant in winter at least throughout the Gulf States where

it will claim no small part of the food supply of our native species.

There are times when the starling makes such strong demands upon our hospitality that even its friends resent its presence. This is during the late summer and early autumn when the vast flocks of birds select some city park or village lawn as a roosting place. Grackles, robins, and martins are often associated with them and the whole may number many thousands. To the ornithologist such gatherings possess great interest, but the tired business man, who has come home to sleep, not to study avian communism, sees in them only a source of noise and filth, and spares no effort to induce the birds to move elsewhere. Frequently, however, he finds it difficult to convince them that they are not welcome. The usages of civilization forbid the murder of even the most undesirable guest, and in default of firearms, Roman candles have been effectively employed. Discharged into trees laden with sleeping birds, they create consternation without fatalities and finally make it plain to the feathered throng that, while we may encourage their coöperation in our gardens we can dispense with them after nightfall. But the direct contact of the starling with man extends far beyond its roosting habits. These other relations, however, belong among those "imponderables" which science can neither weigh nor measure. They have to do with the personality of the starling, with its standing as a citizen and as a neighbor.

When a stranger enters an established community, he is bound, more or less, to disturb existing conditions, and the extent and nature of the local reaction to this disturbance determines his community status.

Viewed from this standpoint the

starling is heavily handicapped. In the first place he is a foreigner. Now whatever we ourselves may be, whether our forbears came over in the Mayflower or on the *Mauretania*, there can be no doubt that our birds are Americans. As such they are not only the products but expressions of their environment. When, in early March, a moving nebulous blur resolves itself into a flock of redwings, they are less birds than the Spirit of Spring. But if the hurrying smudge becomes a passing troupe of starlings, we regard it with disappointment or indifference. It has no seasonal significance.

So the notes of the wood pewee voice the dreaminess of a mid-summer day,—uttered by the starling, they are a mimetic travesty. But, after all, it is only the chosen few who cherish these intimate associations with nature that resent the starling's violations of them. To by far the greater number of those who notice him at all, a starling he will be and nothing more.

Considered, therefore, merely as a bird, the starling has much to recommend him. He is trim in form and attractive in color. His summer dress of black with iridescent sheen has claims to real beauty, and the change of plumage which gives him a polka-dot costume in winter increases our interest in his appearance.

As a member of the small group of walkers, (as opposed to hoppers) among perching birds, he has further claims to distinction. We follow with approval his rapid steps as he zigzags his busy way across the lawn, probing to right and left in his stride.

I have often thought that if the house sparrow could sing, he would have attained a popularity he can never hope to achieve—so great is the power of a pleasing voice. While the

starling may not claim high rank as a songster, at least he has a pleasing voice and a wide variety of notes. His most characteristic note is a long drawn, cheerful whistle, human-like in quality and easily imitated.

Less often heard is the starling's musical soliloquy which, with fluttering wings, he delivers, from a more or less exposed position. I heard it on one occasion from a thatched roof beneath which I had slept when every straw seemed vocal, each in its own way. It is a curious melange of chuckles, guttural gurgles, and low whistles, often interspersed with imitations of the notes of other birds.

It is said that more than twenty of our birds are mimicked by the starling, but I sometimes wonder whether some of these alleged imitations are not really resemblances between the starling's natural notes and those of the American bird they recall. I find it difficult, for example, to believe that the starling whistle, which is so remarkably like the call of the wood pewee has in truth been acquired from that bird. It is heard so frequently at such widely separated places, and in localities not frequented by wood pewees that, if it has been learned in America, one must almost believe that it is now an inherited part of the bird's repertoire.

But if the notes of adult starlings have merit, the voice of young starlings uttering their food call is exceedingly disagreeable, harsh, rasping, and insistent; inspired by no higher emotion than that which arises from an apparently unfillable stomach, it rends the air with discord. Nesting among the earliest of our passerine birds, the young of the first brood take wing about May 15, and with ceaseless cries

appeal to their long-suffering parents for food and still more food.

As soon as they have learned to feed themselves the young begin to gather in flocks, while the parents produce a second family. This appears late in June or early July, and when it, too, has been weaned, both young and old join the flocks of the first-born, forming those tremendous gatherings, the aerial evolutions of which constitute the chief claim of the starling to a place in the birds Hall of Fame.

Seen in the spring, we should associate these remarkable activities with some function of the mating season. Occurring in the autumn, not even a latter-day novelist could successfully attribute to them a sexual significance.

A thousand, five thousand, ten thousand birds mount to the sky, animated by one impulse,—the flock becomes a ball symmetrical as a globe in outline; suddenly, with no suggestion of disorder, it lengthens to an ellipse which a moment later, narrowing in the middle and concentrating at the ends, simulates a dumb-bell in form. Again a change, and a dusky snake undulates across the heavens only to telescope on itself and become a ball again.

All these movements are performed with marvelous precision. The thousands of birds act as one individual. There appears to be no leader; no word of command. How can we explain the community of feeling which controls them? It is a dance in the clouds to the music of the winds,—a pure expression of a *joie de vivre*, which raises the industrious plodder of our lawns to an ethereal realm where nationalities are unknown and the glorious heritage of flight is the universal emblem of bird life.



Underwood & Underwood

The Epstein Panel in the Hyde Park Sanctuary Dedicated to the Memory of W. H. Hudson

IN erecting a memorial intended to symbolize the work of one whom we would honor, it is eminently fitting that, theoretically at least, the designs under consideration should be submitted to the memorialized. It is difficult to believe that those responsible for Mr. Epstein's contribution to the Hudson bird sanctuary can have followed this plan. One can imagine Hudson's sensitive nature recoiling from Epstein's strange concept as he would shrink from the publicity which it has aroused.

Bernard Shaw has expressed vigorous approval of this tablet, but he seems as much out of place here as a critic as Epstein does in the rôle of sculptor. Rather should we seek the opinion of Hudson's friends who have an understanding sympathy with his work, and this we find in the appended quotation from the current issue (Vol. XI, No. 6) of *Bird*

Notes and News, the organ of the Royal Society for the Protection of Birds, an organization with which Hudson had the closest association.

"Round the merits and demerits of Mr. Epstein's characteristic panel controversy has raged. The real point, however, is not concerned with Epstein at all, but with the question of an appropriate memorial to Hudson. And the one thing certain is that in order to consider its claims as Art, it is necessary to put away every thought of the man it commemorates and every recollection of the elusive and mysterious maiden of his imagination—'singularly delicate in figure and features,' 'small and slender,' 'with delicately shaped little hands and feet'; 'nimbus of misty hair and silky robe'—so monstrously associated with the figure carved on this Portland stone. Dissociate it from 'Rima' and from W. H. Hudson; regard it only as a representative production of Epstein's peculiar genius; and artistic controversy as to its meaning and merits might be left to work itself out."



ROOSEVELT MEMORIAL BIRD FOUNTAIN

By Bessie Potter Vonnoh, whose design expresses the child's love of birds as symbolic of the ideal relations between birds and man. This fountain, the gift of hundreds of Mr. Roosevelt's friends and admirers, will be placed by the National Association of Audubon Societies in the Roosevelt Bird Sanctuary at Oyster Bay to commemorate Mr. Roosevelt's love of birds and his work for their conservation

Meetings of Ornithological Societies in the American Museum

THE American Ornithologists' Union will hold its Forty-second Annual Congress in the American Museum November 10-12 next, and on the evening of October 27 and the following day the National Association of Audubon Societies will hold its annual meeting here.

In view of these two coming events it will be timely to say a word here concerning these two organizations and also to speak of the Linnæan Society (in effect, a local bird club) which meets in the Museum bi-weekly from October to May.



THE AMERICAN ORNITHOLOGISTS' UNION

The American Ornithologists' Union¹ was organized in 1883 and its first meeting was held in the American Museum on September 26, of that year. The call for this meeting was signed by J. A. Allen, Elliott Coues, and William Brewster, all officers of the Nuttall Ornithological Club of Cambridge, Massachusetts, the parent organization from which the Union sprung.

Forty-eight of the more prominent ornithologists of the United States and Canada were invited to attend this meeting and of this number twenty-one were present. From this beginning the Union had, on January last, a total membership of 1637. Comparison of these figures gives us some conception of the growth of the interest in birds

during the past forty years, a growth for which directly, or indirectly, the Union is largely responsible.

To the Union and its members we owe the formation of the Biological Survey of the United States Department of Agriculture and the inauguration of organized bird conservation through the establishment of the Audubon Societies. The three stand respectively for the Science, Economics, and Sentiment of Ornithology, and cover effectively the principal relations of birds to man.

The annual meeting of the American Ornithologists' Union is an event which no bird lover should miss if he can possibly arrange to be present. The days are devoted to the presentation and discussion of bird studies made in field and laboratory, the evenings to social gatherings where the members have an opportunity to meet and exchange experiences.

The program of the meeting for 1924, which was held at the Carnegie Museum in Pittsburg, included the titles of fifty-six papers. They were based on observations made throughout the greater part of the world. Many were illustrated with lantern slides and one whole afternoon was devoted to the showing of motion pictures. There was also an exhibition of paintings of birds in which thirty-one artists were represented by 140 subjects. It is proposed to hold a similar exhibition in connection with the Congress this year.

The Union changes its place of meeting each year and probably will not visit New York City again for six years or more. Local bird lovers,

¹An article on the history of the Union, by T. S. Palmer, was published in the October, 1918, issue of the AMERICAN MUSEUM JOURNAL. The facts in relation to the Union's formation are taken from Doctor Palmer's article.

whether or not they are members of the Union, should not fail, therefore, to attend the Congress of November next. Information regarding the program, hours, etc., may be obtained by addressing the A. O. U. Committee of Arrangements, care of the American Museum.



NATIONAL ASSOCIATION OF AUDUBON SOCIETIES

The Twenty-first Annual Meeting of the National Association of Audubon Societies will be held in the American Museum of Natural History on Tuesday, October 27, 1925. A public meeting will be held in the main lecture hall the night before. On this date, as at former annual meetings of the Association, there will be gathered here from many parts of the country, people interested in the study and preservation of wild birds and wild animals. The reports and addresses, especially those made at the night session, are of popular interest, and the general public is cordially invited to attend.

The officers and directors of the Association will have to report a very large volume of activities in various fields of the Association's endeavor. In the Junior Department, for example, the extension work among the children has been unusually successful during the year, nearly 300,000, having been enrolled throughout the United States and Canada as members of bird-study clubs, where, under the guidance of teachers, and by means of the literature supplied by the Association, they have been taught the great lessons of the beauty and value of America's wild bird life.

These clubs of young people have

built and erected tens of thousands of bird boxes; have given hundreds of entertainments where programs have been rendered to the delight of their fellow-students and visiting parents; feeding shelves by the thousands have been put in position at schoolroom windows or on the snow-covered lawns at home, and the cause of bird protection throughout the country has been stimulated by the activities of these keen, youthful observers.

The Association has maintained its far-flung line of wardens who guard colonies of water birds along our coast from the Canadian line to Mexico and in many of the interior swamps of the Southland.

Five lecturers have been supported in the field. A representative working for game protective measures was kept in Washington throughout the session of Congress.

The work of the International Committee for Bird Protection, an outgrowth of the Association's effort started three years ago, has now spread to fifteen countries, and the New York office at 1974 Broadway, is in constant touch and exchanging ideas with workers in the field of bird protection in many European countries, as well as in South Africa, Australia, and far-off Japan.

The Association has continued the enlargement of its series of colored pictures of birds, reproduced from original paintings by America's leading bird artists. Two of the plates accompanying this issue of *NATURAL HISTORY*, are samples of the pictures issued by the Association to the extent of two million or more annually.

The National Association of Audubon Societies has for many years been the largest institution in the world devoted to the protection of wild life, and its

influence during the twenty-one years of its incorporative history has been written large upon the minds and hearts of mankind.



THE LINNÆAN SOCIETY OF NEW YORK

The Linnæan Society of New York was founded on March 7, 1878, by ten young men, most of whom in later years became distinguished naturalists. While the name suggests that the founders aimed to develop a general society of natural history, their professions soon scattered them to various parts of the United States, and this aim was never fulfilled. In the meantime the strongest interest of the Society had been ornithology, and the new members that have joined have been attracted by the emphasis laid on this particular branch of zoölogy.

For many years the Society was exceedingly small, and it was somewhat surprising that the largest city in the country produced far fewer amateur ornithologists than much smaller places. Had it not been for the devotion of Dr. J. Dwight, the Society would probably have expired. He did not retire from the presidency until a group of active students had grown up competent to direct its activities.

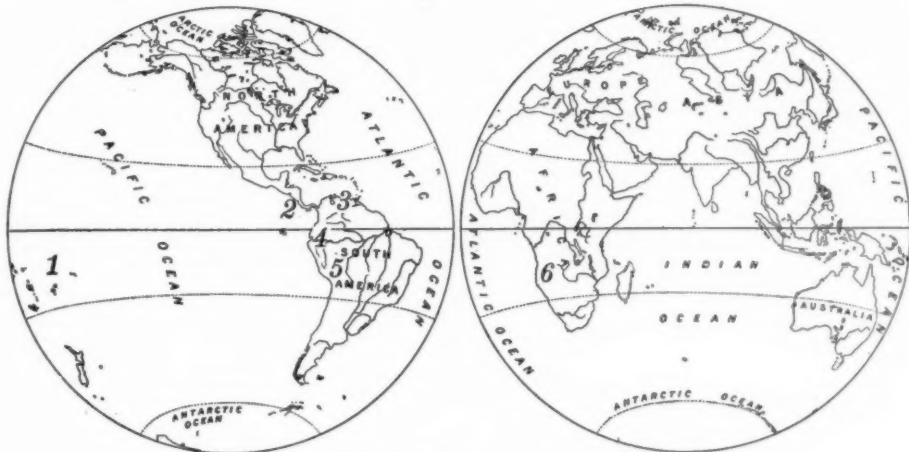
During the past five years under the

presidency of Mr. J. T. Nichols of this Museum, the active membership has greatly increased, the average attendance at meetings being forty or more, and in addition to the presentation of a formal paper, the reports of field work often consume an hour. The Society coöperated with the Museum in the preparation of a detailed *Handbook of the Birds of New York City Region*, and the members of its Local Avifauna Committee rendered important additional assistance. A recent *Abstract of Proceedings No. 36* gives considerable supplementary information. Those parts of the "Local Region" where detailed knowledge of the bird life was particularly defective are now being especially investigated by competent members, as Mr. Miller shows in his article on the bird life of northwestern New Jersey, in this number of NATURAL HISTORY.

All those interested in birds in the vicinity of New York City are urged to affiliate themselves with the Linnæan Society. The meetings are held the second and fourth Tuesday evenings of each month from October to May inclusive at the American Museum of Natural History. The dues are only three dollars a year. The meetings will stimulate the interest of all bird lovers, and they will find companions to share it. They will gain information, new ideas, and a broader viewpoint.



REPORTS FROM THE FIELD



LOCATION OF MUSEUM EXPEDITONS

1. Beck 2. Benson 3. Tate 4. Ollala 5. Watkins 6. Boulton

BECK IN THE FIJIS

After four years among the islands of Polynesia, travels which have been described from time to time in *NATURAL HISTORY*, the Whitney South Sea Expedition nearly a year ago transferred its base to the Fiji group. Here during many months Mr. Beck and his associates have painstakingly worked not only the larger high and forested islands but also a good proportion of the outlying more or less uninhabited islets of this Melanesian archipelago. The expedition has recently moved on once again, this time to Tonga, or back from the territory of the frizzly-haired oceanic negroids into that of one of the tallest and handsomest branches of the brown-skinned Polynesian people.

In the meanwhile, the collections obtained in Fiji, assuredly the finest representation of the land and sea birds of these islands ever brought together, have reached the Museum and have been made available for study.

The wealth of Fijian land bird fauna proves to be surprisingly great. In Suva, the capital of the Fijis, as in Papeete, the metropolis of French Oceania, the introduced Asiatic starling or minah is usually the first bird which the visitor encounters. Other imported and now well-established species, moreover, are likely to come to his attention before he

has seen or heard the first native Fijian bird. The pleasant notes of an Indian bulbul or the cooing of the ringdove, for example, may be the first bird music to strike his ear. When one gets farther afield, however, foreign birds are no longer in evidence except at a few of the islands into which the owners of plantations have introduced them. At Thithia Island, for instance, Mr. Beck was surprised to find a considerable flock of minahs which, however, clung chiefly to territory within a hundred yards of the dwelling and out-buildings about which they lived.

Fiji has a far larger and more varied land bird population than the Pacific islands more remote from the Asiatic continent and the Malaysian region. Gorgeous parrots, pigeons clad in orange or golden plumage, native weaver birds, and a variety of species of hawks, thrushes, old-world warblers and flycatchers combine to lend great charm and importance to the bird life of the group. One of the features in distribution which impressed Mr. Beck is the extremely limited range of certain birds which would seem to be well equipped for flying from island to island. At Matuku Island the expedition first made the acquaintance of the so-called barking pigeon which, according to Mr. Beck's notes, has the voice of "an aged, well-fed, medium-sized dog."



Photograph by R. H. Beck

Visitors to the "France." Dancers of a Fijian chief brought on board the Museum schooner to render a *meke* or native dance, during the performance of which the participants remain seated

To certain other islands within sight of Matuku, however, the barking pigeon apparently never makes its way. Again, the islands of Totoya and Kambara are but forty-five miles apart, and yet each harbors a different species of pigeon. Sixty miles to the northward is Naiau where both the Totoya and the Kambara species, as well as the barking pigeon, all occur together, and yet the last has never worked its way along the adjacent string of apparently suitable islands, no two of which are separated by a greater distance than sixteen miles.

Some of the smaller land birds are still more sedentary residents of their respective islands, while in some other cases the expedition found evidence of very wide-spread range in the search for a well-suited environment. The small, clear-voiced whistler, which is common on Wangava Island at the south end of the Lau division of the Fiji group, cannot be found either on Kambara, three miles away, or on Marambo, six miles away. But why the mottled honey sucker, common to Tonga, Samoa, and many islands of the Fijis, should elect to thrive on Marambo and avoid the much larger and more attractive island of Kambara, which is but six miles away, passes the understanding of the naturalists of the

"France," and why from Marambo and Fulonga, which are twelve miles apart, the same species should jump over Namuka only to reappear on Mothe, residing there as well as on half-a-dozen successive islands for fifty miles northward to the village of Loma Loma, on Vanua Mbalavu—these are among the puzzling field problems. Moreover, this temperamental honey sucker apparently finds the northern limit of its range within the borders of the village of Loma Loma, with ten miles of what would seem like perfectly adapted country stretching on beyond. Finally, it seems to avoid Kanathea and Naitamba, respectively ten and twelve miles west of Vanua Mbalavu Island, only to reappear on Yathata, thirty miles beyond.

Such are only a few examples of one special group of problems in the most fascinating insular region of the earth.

Mr. and Mrs. José G. Correia, who have for several years been associated with Mr. Beck in the South Pacific work, continue to render the Museum splendid service—often under very difficult conditions. Mrs. Correia, who had had no previous experience, has developed into an unusually skilful preparator; her bird skins, for example, are among the best specimens ever received from the field.



Photograph by Rudyerd Boulton

Typical river scene in the semi-arid country near Santiago, Panama

BENSON IN PANAMA

Mr. R. R. Benson, whose explorations in the field are being financed by Mr. Griscom, has recently returned to Santiago, Veraguas, after spending the dry season in the mountains back of Santa Fé, where he secured more than one thousand specimens in a little over two months. He writes on April 1 as follows: "Seven hundred and ninety birds made up and boxed, ready to ship, since I arrived on February 14, is my main excuse for not having written since leaving Santiago. But there have been other reasons also; rain every day except the last week, an eternal wind, a heart-breaking hill to climb every day, and the never-ending battle to keep the two boys I have with me from deserting. However, am still going and have three hundred shells left, so hope to complete up to a thousand skins in the next ten days. . . From what I have seen and learned of the country I am satisfied that the division point (between the faunas of western Chiriqui and Veraguas) we are looking for is far from Santa Fé. To get to Calovegona will be impossible this summer. It is more than two days from here, and no horse can get there; everything must be packed in by men. . . There are quetzals (paradise frogs) only a short distance east of Santa Fé. I did not see them, but they are well

known there and I am perfectly satisfied with the evidence. . . The highest point here approximates the highest point we reached on the Cerro Flores; a little less moss and an occasional patch of earth underfoot. But very few birds on the summit, high wind and always wet and cloud-bound. As to climate, you would enjoy it. I use a sweater after night fall and sleep in a sleeping bag."

Mr. Benson's hope that his collection would contain some interesting things has been amply justified. It contains several new subspecies, one cactus wren new to the avifauna of Panama, and many rare and little-known species discovered here sixty years ago by Arcé, whose collections are in Europe. Mr. Benson could hardly be expected to obtain in one season all the species which Arcé obtained in several, but a year's work has added many which Arcé never found, and the American Museum already has 398 species represented in a region from which only 400 have been recorded. Scarcely fifty species were previously represented by specimens in American museums from this section. Mr. Benson is now in Santiago, Veraguas, outfitting for a trip south into the Macaracas region in the center of the Cape Mala peninsula. Altitudes are reported as high as 4000 feet and no collections exist from this section.

TATE IN VENEZUELA

Between February and June, 1925, G. H. H. Tate, accompanied by H. J. Clement, collected birds and mammals in northeastern Venezuela securing nearly 1000 of the former and some 400 of the latter.

Their collecting stations in the Tropical Zone were at Cumanacoa (700 ft.), a small town in a flat arid tropical plain; San Antonio de Maturin (1800 ft.); Neveri Valley (2400

OLALLA AND SONS IN EASTERN ECUADOR

Until Joseph H. Sinclair visited eastern Ecuador in 1921, the existence of Mount Sumaco was semi-mythical. It appears on the map of Villavicencio (1858) but is not included in the far more authoritative map of Wolf (1892). When, therefore, Sinclair returned with an actual photograph of the mountain and a statement that it attained an



Photograph by G. H. H. Tate

A part of the summit of Mt. Turumiquire, the highest mountain in northeastern Venezuela

ft.), where they first found humid forests; and Cocollar (2600 ft.) in the arid uplands. At Carapas (5600 ft.) Mr. Tate writes: "Here and in the adjacent coffee plantation of La Trinidad, on the flanks of Mt. Turumiquire, we found the first tree ferns and met with many subtropical birds. This is the upper limit of cultivation and from this point five days were required to cut a trail through the tangled vegetation and up the precipitous slopes to the unexplored summit of Mt. Turumiquire. This, according to our aneroid, has an elevation of 9750 feet. We camped at 7900 feet. The summit of the mountain is covered with brush immediately below which there is heavy forest. Life, however, is scarce and we secured here only nine species of birds and two of mammals."

Before leaving New York Mr. Tate had been urged to reach the summit of Turumiquire and only those with experience can realize the persistence and determination which were required to enable him to attain his objective.

elevation of 12,700 feet, our interest in its fauna was at once aroused.

Sinclair writes:¹ "Forty-four miles below Napo we observed a lofty cone-shaped peak about 30 miles to the northwest, which we were told was named Sumaco. Vertical angles and intersections to this from several places on our traverse determined the exact location and gave its elevation as 12,700 feet above the sea. Sumaco is beyond all question the most remarkable physiographic feature we saw on the Amazon plain. We believe our expedition is the first to locate it accurately and to obtain its elevation."

Prior to the publication of his observations Sinclair had told us of them, and during an expedition to Ecuador in 1922, I casually inquired of Ramon Olalla, a native collector in our employ, if he had ever visited Mt. Sumaco. To my surprise he promptly replied that he had and followed this statement with convincing evidences of its accuracy. Asked if he

¹Geographical Review, 1923. p. 196.

would go there for the Museum, he said, "Si, señor," and when I added "When?" without hesitation he responded "Mañana."

Ramon's father, Carlos Olalla, vetoed so early a departure, but in due time he, with Ramon and two other sons, for whom we suggested the firm name, "Olalla e hijos," agreed to visit Sumaco and collect its birds from base to summit.

Within two years they had fulfilled their contract, and we now have in the museum a collection of beautifully prepared birds' skins which adequately illustrate the avifauna of the region from which the mountain rises and also the life zones on its slopes. Among them are members of species not before contained in the Museum, and several, including one genus, new to science.

Knowing that the Guacamayo range which connects Sumaco with the main Andean chain does not rise above subtropical elevations, we had hoped that the Temperate Zone on Sumaco would prove to be wholly insular in character. But its bird life is practically identical with that of the corresponding zone on the eastern Andes and this close faunal affinity implies near orographic relationship.

We supplied the Olallas with a thermometer and requested them to make daily records of the temperature at sunrise and at sunset. These records, in connection with their collections, give us a fairly accurate conception of the limits of life zones. When, for example, in ascending the Rio Suno, they reached the old town of San José on the flanks of Sumaco, the birds sent to us indicated that they had reached the lower borders of the Subtropical Zone, and this supposition was supported by the temperature record which shows a fall of 4 degrees centigrade (from 18° C to 14° C = 64.4° F. to 57.2° F.) in the morning and of 5 degrees (from 21° C to 16° C = 69.8° F. to 60.8° F.) in the evening.

Similarly, at the localities from which were sent birds characteristic of the Temperate Zone, the morning temperature fell to 6° C (42.8° F.) and the evening temperature to 10° C (50° F.).

The Olallas also kept a record of their itinerary. It gives, as a rule, only a date and place, or the briefest explanation of the cause of some delay, but one familiar with the conditions they were obliged to encounter, can read between the lines the story of events which less-seasoned travelers would have made the basis

of tales of hardship and adventure. Here, for example, is a quotation from the account of their return from the Rio Suno, near the base of Sumaco, toward Quito.

"El veintiseis de Abril emprendimos viaje para Quito haciendo las jornadas siguientes. El veintiseis llegamos al Rio Huataraco, el 27, el 28, el 29, nos detuvo dicho rio ha motivo de la creciente. El treinta llegamos al Rio Tucuno. El 1, el 2, el 3 paramos detenidos por este caudaloso rio. El cuatro llegamos a un lugar llamado Huayrachina. El cinco llegamos al Rio Cotapino. es decir a las cabeceras, el seis llegamos al Rio Bueno. El 7, el 8, el 9, el 10, el 11, nos detuvo este mismo por sus fuertes crecientes. . . "

Which freely translated reads: "April 26, 1923, we began our trip toward Quito, making the following daily journeys: The 26th, we reached the Rio Huataraco. The 27th, 28th, and 29th, we were detained by flood in this river. The 30th, we reached the River Tucuno. The 1st, 2nd, and 3rd of May we were detained by this great river. The 4th, we reached a place called Huayrachina. The 5th we reached the headwaters of the Rio Cotapino. The 6th we reached Rio Bueno. The 7th, 8th, 9th, 10th and 11th we were detained by heavy floods in this river."

These entries show that eleven of the first sixteen days of their journey were passed waiting for rivers to fall to fordable depths. Doubtless the only shelters available were palm-thatches erected by themselves. The country offers no dependable food supply and a five-day journey which is expanded to sixteen days, implies, where one's back is the only means of transportation, an uncomfortable shortage of rations.

Reaching Archidona May 17, they were detained for lack of carriers until June 6 and finally reached Quito on June 14.

On April 25, 1924, Carlos Olalla fell while crossing a river on the flanks of Sumaco and severely injured his leg, forcing them to leave hurriedly for Quito. Baeza was reached on May 6, but the "inflamación gravísima" in the injured member and the almost impassable condition of the trails, forced them to wait here until both the patient and the going had improved.

Their work on Sumaco finished, the Olallas are now collecting for us in other parts of eastern Ecuador.



Photograph by H. Watkins

Some natives of the Marañon at Pomará, Perú

WATKINS ON THE RIO MARAÑON

After two years' constant field work, Harry Watkins, who has so effectively represented the Museum in Peru, has completed a section from the arid coastal region near Payta to the humid Amazonian forests on the Marañon at Pomara above the Pongo de Manseriche. For the first time, the bird life of this region of exceptional faunal importance is adequately represented by specimens. While Watkins secured an unexpected number of new species, his collections are chiefly valuable for the information they afford concerning the origin of many species of the equatorial arid fauna of the Pacific Coast and of the relationships of this fauna to that of the Marañon valley.

At Porculla, not far south of the trail between Piura and Huancabamba, the summit of the western Andes attains an elevation of only 7078 feet, the lowest point between Pacific and Amazonian drainage in the Andes, making it probable that the ranges of certain birds characteristic of the Marañon Valley and Pacific Coast may still be continuous.

The last state of Watkins' journey down the Marañon to where Amazonian forests are first

encountered, was made with no little difficulty. Watkins writes: "The natives of Jaen are so afraid of entering the Indian territory on the Marañon that I was quite unable to get even a boy to accompany me as *arriero*. Fortunately, I have my own animals and I was able to entice an American missionary and his wife to join Mrs. Watkins and me on the expedition. They had been some time in Jaen and wanted very much to know that country but had no means of getting there. He helped me with the mules and, after quite an exciting trip over trails that were never meant for large animals, we accomplished our object."

With that take-it-for-granted spirit which sees in risk and adventure only the day's work, Watkins says nothing about the Indians, but that he found them is evidenced by his photographs, of which we here reproduce one.

Returning from Pomará, Watkins made a shipment of 800 birds from Piura and then went back to Jaen to travel up the Utcubamba with the especial object of learning the northern limit of the humid temperate zone in the East Andes of Peru.

At the very beginning of this journey, in

crossing the Marañon, he had the misfortune to lose his saddlebags containing about one-hundred dollars in silver and, what was even more valuable, his aneroid barometer. He writes: "The river was very high and the only means of crossing it was by *balsa*, or rather, what the people at Bellavista call a *balsa*, consisting of six small logs roped together. As this contrivance would hold only 200 pounds, we were from 6 A.M. to 9 P.M. in making the many crossings necessary and dragging the animals over . . .

"As I was holding on to the bit of one animal with one hand and leading two full-laden cargo animals with the other, and it was almost dark, I did not see the saddlebags drop or notice that they had fallen until we crossed other branches and were unloading."

The presence of bubonic plague prevented Watkins from reaching Chachapoyas where it was reported that 400 Indians had died. Meanwhile he had found heavy Temperate Zone forest where, he writes, he found many birds new to him.

The animals, he reports, are all in good condition, and adds that the "natives think it wonderful they could have traveled so far, as their beasts are rarely able to make the journey from Jaen. After this trip I believe that they can get over anything, for they are now well-trained at climbing, swimming rivers, fording, and balancing along two-pole bridges." Supplies sent to Watkins by way of Pacasmayo have unfortunately been held up on the coasts by the phenomenal rainfall in western Peru this past spring, but with his usual resourcefulness, we know that in some way he will get them.

BOULTON IN ANGOLA

Mr. Arthur S. Vernay, who has already done so much to enrich our collections with mammals and birds from India and Siam, has recently turned his attention to Africa, a

continent unrivalled for its big game. The main purpose of the Vernay Angola Expedition is the securing of specimens of the giant sable antelope. A general collection of vertebrates is also being gathered; and Mr. Herbert Lang, formerly in charge of the Congo Expedition and now acting as general manager of the Angola expedition, is accompanied by Mr. Rudyerd Boulton, who will devote special attention to the birds of the region traversed. Last year he was a member of Mr. Ludlow Griscom's party in western Panama. Messrs. Lang and Boulton sailed from New York on March 14th, to be joined by Mr. Vernay in June.

Work was begun at Lobito Bay on the coast of the province of Benguella, and continued along the railroad that penetrates the interior highlands. News has already come of the success of the party, and their collections include several hundred birds from country that was hitherto a total blank on our operations map.

The highlands of Benguella offer a peculiar interest for the zoogeographer in that they harbor many species closely allied to those of the East African plateaus, there being a continuous highland connection by way of the Upper Katanga. The fauna is at the same time much less like that of the more humid and lower district of northern Angola which resembles the western Congo basin. It also differs widely from that of the drier country of Damaraland to the southward.

Some forty-five years ago a notable collection of Benguellan birds was made for the Lisbon Museum by Senhor Anchieta; but since that time almost the only collection of any size was gathered by Dr. W. S. Ansorge for Lord Rothschild and the British Museum. A number of peculiar species of birds are known to be restricted to the region, and it is with pleasant anticipation that we look to their being procured for the American Museum through the generosity of Mr. Vernay.



NEWS FROM THE STUDY



THE STAFF OF THE BIRD DEPARTMENT

Front row, sitting, Griscom, Miller, Chapman, Murphy, Chapin

Back row, standing, O'Brien, Mrs. Fraser, Dwight, Mrs. Naumburg

(The framed picture in the background is that of D. G. Elliot, founder of the Museum's department of birds.)

Recent Additions to the Collections

PINK-HEADED DUCKS

(See Frontispiece)

AS announced in the March-April number of *NATURAL HISTORY*, Mr. Vernay and Colonel Faunthorpe have obtained for the American Museum the skins of a pair of the very rare pink-headed duck of India, *Rhodonessa caryophyllacea*. The specimens have now reached the Museum, and have served as models for the colored frontispiece by Jaques in the present issue.

For some years past it has become increasingly difficult to secure specimens of this duck, and it has been suspected that it is on the verge of extinction. Nowhere was it ever known in great numbers, though the range extended from the base of the Himalayas south to Madras on the eastern coast of the Indian Peninsula. The district whence our specimens came, north of Kheri in the province of Oudh, about ninety miles from Lucknow, is probably one of its last retreats.

Not long ago Mr. E. C. Stuart Baker, than whom no one is better posted today on Indian birds, wrote us as follows:

"I am afraid cultivation is pushing the pink-headed duck back and back into the swampy, feverish country at the base of the eastern Himalayas, where Europeans only go for shooting trips, and which is a country not beloved by Mahomedan bird-catchers. I cannot think the birds are exterminated, yet no one ever gets any; and at one time they were quite plentiful in Purnea, Malda, and the adjoining districts of eastern Bengal. Even then, however, no one ever saw them except when out tiger shooting; and now most of their haunts are drained and deforested in these districts. Their young perhaps have had to seek pastures new."

The unusual coloration of the adult male and female is shown very adequately in the plate. To what other genera of water fowl *Rhodonessa* is most closely allied is a difficult question to decide. It has been more or less customary to place it in the subfamily *Plectropterinae*, along with other tropical species such as the spur-winged goose, the comb-ducks, and the muscovy duck. It is very probable that some day this assemblage will be broken up, and its members redistributed. Certainly the pink-headed duck has several external similarities to diving ducks like the pochards and our own canvasback. Because of this unsettled systematic position, it is all the more satisfying to have the bird so splendidly represented in the collection of the American Museum.

THE CALDWELL COLLECTION OF BIRDS

The most notable recent addition to the African bird collection is a series of 3268 specimens purchased by the Trustees of the American Museum from Captain Keith Caldwell, of Entebbe, Uganda. They were obtained at many widely separated localities in Kenya Colony, and include representatives of approximately 630 species or subspecies—fully one half the species known to inhabit the area formerly called British East Africa. Many of them are exceedingly rare, and not a few have been discovered only recently. Very important contributions to the ornithology of eastern Africa have been made of late by Dr. V. G. L. van Someren, and it was with his list of the birds of East Africa and Uganda that the skins in the present collection were provisionally identified.

A large proportion of the species, and some even of the genera were hitherto unrepresented

in the American Museum collection. Among the latter are the lesser flamingo, *Phaeniconaias*, and among the *Passeres*, *Lioptilus*, *Calamonastes*, *Agithospiza*, *Speculipastor*, and *Galeopsar*. About a year ago Captain Caldwell also presented us with our first specimens of the genus *Tmetothylacus*, a rare pipit, all but unique among the *Passeres* of the world in having the lower portion of the tibia scutellate like the tarsus. *Muscisaxicola*, a small terrestrial bird of the Andes and southern South America, is its only parallel in this respect.

Our earlier bird collections from East Africa numbered less than 700 specimens, having been procured mainly by Herbert Lang, Jenness Richardson, Carl Akeley, James L. Clark, and Arthur Loveridge. It is well-nigh impossible to study the avifauna of one section of a continent without having representative material for comparison from adjacent countries. For some time past Doctor Chapin has found valued assistance in a part of the Caldwell Collection which had been loaned to the Museum, and the acquisition of the entire series will greatly facilitate the completion of the Congo bird report, as it will also aid in the determination of the birds now being collected in Benguela by the Vernay Expedition.

FATHER CALLEWAERT'S BIRDS FROM THE KASAI DISTRICT OF THE CONGO

One of the very last regions in the Congo to be investigated ornithologically was the basin of the Kasai River, in its south-central portion. This country was a well-known field of missionary activity and had been visited by several anthropological expeditions, but one can hardly say that its birds had been studied until 1921, when Dr. H. Schouteden of the Congo Museum in Belgium paid it a special visit. Except for three or four small lots of birds received by European museums, no collecting in this branch had been done there previously.

Inasmuch as the Kasai district lies just south of the Congo forest belt, the general nature of its fauna could be inferred from what was known of the countries to the west and the east—the Lower Congo and the vicinity of Lake Tanganyika. Doctor Schouteden's collection of birds, in the main, confirmed this prediction. After Doctor Schouteden's visit, Father R. Callewaert of the

Mission of St. Joseph near Luluabourg, offered to collect some birds and mammals for the American Museum. Thus far we have received from him some 1290 specimens of birds, including about 216 species, many of them of real rarity, and several previously unknown from the Belgian Congo, such as *Francoelinus shelleyi*, *Anthoscopus ansorgei*, and *Fringillaria impetuani*. *Erythrocnus rufiventris*, a small heron, was not only new to the Congo, but represented a genus lacking in the American Museum. Father Callewaert also rediscovered a swallow, *Phedina brazzae*, previously known only from a single specimen taken by J. de Brazza in 1885 on the middle Congo River.

The present knowledge of the avifauna of the Kasai, due almost entirely to the work of Doctor Schouteden and Father Callewaert, reveals a surprising intermingling of the Congo forest fauna with grassland species of Angola and the Lower Congo. This helps in explaining the occurrence of many forest types in the Kwanza River district of Angola; and it is readily correlated with the nature of the vegetation in the Kasai, a savanna country with extensive "gallery forests" along some of the rivers, and scattered patches as well of true equatorial forest.

GROWTH OF THE OLD WORLD COLLECTION

On the completion of the new northeast wing, a room formerly devoted to mammals became available for the study collection of birds from the Old World, where they have all been arranged in systematic order so as to be readily accessible. Early in 1923 a list was compiled of all the living genera of birds from the eastern hemisphere not represented either in the exhibition collection or the study series. Sharpe's *Hand-List* was taken as a standard, as it had been for a similar purpose by some of our sister museums. At the outset it was found that we lacked 435 genera from the eastern hemisphere, and by gift, purchase, and exchange this figure was reduced to 324 before the beginning of 1924, and to 261 on July 1, 1925. The number of New World genera lacking is less than 20; and among all the families of existing birds commonly recognized, only two—the *Atrichornithidae* or scrub-birds of Australia, and the *Paramythiidae* of New Guinea—are now unrepresented in this museum.

A COLLECTION FROM NORTH-EASTERN VENEZUELA

Through the generosity of Mrs. E. M. B. Naumburg, the Museum has purchased from Mr. G. H. H. Tate a collection of somewhat more than 650 birds from northeastern Venezuela which throws much-needed light on the life-zones of this region and enables us to correlate them with those of the main Andean system.

The discovery of distinct new species of *Diglossa* and *Premnoplex* in the Subtropical Zone of Mt. Turumiquire is of especial faunal significance. Few birds are better indicators of faunal boundaries than *Diglossa*. The nearest point at which the genus has heretofore been found is the Silla de Caracas, distant some 250 miles to the west, whence Hellmayr has lately described a slightly differentiated form of *Diglossa albilatera*, a species ranging thence to northern Peru. While the bird discovered by Tate is very distinct from the race described by Hellmayr, its discovery emphasizes the close relationship of the subtropical life of Caracas and northeastern Venezuela, while the extension of the range of the genus adds another faunal island to those which mark its distribution from Mexico to Argentina and Roraima.

TWO BIRDS FROM THE GALÁPAGOS

Two marine birds of exceptional interest have recently been added to the Museum's exhibits, namely, the Galápagos penguin and the Galápagos flightless cormorant. Both were among the collection of living creatures brought to New York on board the yacht "Noma" when Mr. William Beebe and his associates returned from their cruise to the Galápagos Archipelago in 1923. Both species were formerly common inhabitants of this notable group of islands, but both are, at the same time, represented in few museums. The specimens which have now been mounted are the first examples to be shown in the bird hall of the American Museum.

The cormorant, single survivor of a pair of these birds, lived for many months at the New York Zoological Park. The penguin, not thriving in the fresh-water environment of the park water-fowl enclosure, was transferred in July, 1923, to the Aquarium, at the Battery. Here, for nearly two years, it occupied one of the salt-water pools, became delightfully tame, learned to answer to the name of

"Charlie," and, naturally, proved one of the greatest attractions in an institution of perhaps unequalled popularity.

The Galápagos penguin (*Spheniscus mendiculus*) is one of the smallest examples of its order, which numbers some sixteen or seventeen extant species. It is chiefly notable for its geographical position, since it is confined exclusively to a small cluster of islands which are crossed by the equator, whereas most other penguins are of antarctic or south temperate distribution. The explanation has to do with the influence of oceanic circulation upon sea life, for, from a presumably antarctic source, penguins have been led northward through the tropics by the cool Humboldt Current, which bathes the western shores of South America. The ancestors of the Galápagos species arrived so long ago that it is now very distinct from its nearest relatives, although it belongs to the same genus as the three larger species of "jackass penguins," so-called from their braying voices, which inhabit respectively the Cape of Good Hope, the Magellanic region, and the coast of Peru.

The flightless cormorant (*Nannopterum harrisi*) is one of the most remarkable of adaptations to sea life among birds, for, like the



Flightless cormorant

extinct great auk, it has completely lost the power of flight. The course of its evolutionary history has not taken it in the structural direction of the penguins, the wings of which have been modified to form efficient "flippers" covered with minute scalelike feathers. The wings of the flightless cormorant have retained feathers of normal type, but the quills, as well as the bones of the limb, have been reduced to so great an extent that the wing is practically useless, and the bird progresses exclusively through the action of its large and powerful webbed feet. In general build it is reminiscent of the extinct *Hesperornis*, one of the toothed water birds of the latter part of the Age of Reptiles. In external appearance, especially as regards the elongation of its body and the hairlike character of its dull-brown plumage, it might be called otter-like rather than bird-like. It is found only at the Galápagos Islands, where, in fact, it was not discovered until recently. Neither Darwin nor any of the other early naturalist-voyagers saw it. Its relationships are far less clear than those of its neighbor, the native penguin, but there are reasons for believing that its ancestors came from the northern hemisphere rather than from the Far South.—R. C. M.



Galápagos penguin

THE ANDEAN FLAMINGO

Flamingoes are widely known birds and as widely associated with tropical regions. It will surprise most people therefore to learn



Andean flamingo

that of the six existing species of flamingoes one half nest in the Andes of southern South America above an elevation of 10,000 feet. One of these, the Chilean flamingo, (*Phaenicopterus chilensis*) descends to sea level in southern Patagonia, where it has been found nesting on the shores of Santa Cruz River, laying its eggs on the ground.

The remaining two, James' flamingo (*Phaenicopterus jamesi*) and the Andean flamingo (*P. andinus*), are known only from the Paramo Zone of northern Chile and adjacent Bolivia, where they rarely occur below 12,000 feet.

Until recently neither of these birds was included in the Museum's collections. Now, thanks to Mr. Frederic C. Walcott, we are in possession of a beautiful specimen of the

Andean flamingo, which he collected on Laguna Colorada, Bolivia, at an altitude of nearly 14,000 feet.

In an article of *The Geographical Review* for July 1, 1925, Mr. Walcott states that he saw approximately 20,000 flamingoes and fully 7000 nests on this lake. The nests, however, had been robbed by the Indians, who gather the eggs and bake them for sale in villages at lower altitudes. As a result of this persecution the birds are rapidly decreasing in numbers.

RARE AUSTRALIAN PARROTS

Among the few widely distributed groups of birds that reach their greatest development in the Australian region, the parrots are no doubt

the most notable. South and Middle America are rich in species of parrots, but while these are conspicuously varied in size and color, they are all rather closely allied.

In the Australian region in its broader sense, including New Guinea, New Zealand, and Oceanica, there is much greater diversity in external appearance, while important structural differences divide the numerous species into several family groups. Tiny spine-tailed parrotlets only as large as our red-breasted nuthatch and with similar habits, brush-tongued, honey-eating lorries of most gaudy red, blue, and green plumage, great crested white cockatoos, and even larger jet-black species with bare cheeks, and enormous bills, flightless nocturnal ground parrots of finely mottled greenish hues, together with many other striking forms abound in this region.

A noteworthy group almost entirely confined to Australia itself includes the broad-tails and their allies, of which the beautiful rosella and the undulated grass, or shell parakeet, are well-known examples. These birds are remarkable for their light build, their relatively long, slender legs and toes, and for the absence of the furcula or "wishbone." Their plumage is less "hard" in texture than that of most parrots, and in delicacy of coloring they surpass all others. Unfortunately many species of this group are decreasing in numbers, several of them being very rare or even wholly extinct.

The night parrot (*Geopsittacus*), a native of southern Australia, much like the owl parrot of New Zealand in miniature, is almost certainly extinct. Few specimens are preserved in collections, and one in the Museum of Comparative Zoology in Cambridge is probably the only example in this country. The somewhat similar ground parrot (*Pezoporus*), remarkable for its long slender claws, still exists in greatly reduced numbers.

The scarlet-chested grass parakeet, a beautiful species with green back, blue head and wings, bright red chest and yellow underparts, is probably entirely gone.

In the last few years, the Museum has received from the New York Zoological Park specimens of several of the rarer Australian parakeets, which were brought to this country by the veteran collector of live animals, Ellis S. Joseph.

The golden-shouldered parakeet, fortunately less rare than some of its relatives, is one of the most distinctively colored, its turquoise blue

underparts and large yellow wing patch being in marked contrast to the dark earthy-brown back and the black cap.

A much rarer bird and one in imminent danger of extinction is the blue-vented or Bourke's parakeet, one of the most tastefully dressed members of the whole tribe. The dark brown upperparts and wings are given a scaled appearance by the pale yellow margin of each feather, the underparts of the body are soft rose-pink and the lower tail coverts turquoise blue. Two related species, the blue-winged parakeet and the red-shouldered grass parakeet are mainly green above and yellow below with blue wings. Mathews in his great work on the birds of Australia (1917) stated that the latter was probably extinct, but fortunately his surmise has proven incorrect.

Another species that for a time it was believed had disappeared is the paradise or beautiful parakeet, one of the most attractive members of the group. Probably no live examples of this bird have ever reached America, but the Museum has recently acquired a fine male specimen in exchange. In an interesting article in the *Emu* for July, 1922, Mr. A. H. Chisholm announced the gratifying news of the rediscovery of the paradise parakeet. Photographs show the live birds at their nest in a hole dug in a termite hill.

Three larger Australian parrots not distantly allied to the broad-tails, and almost of the size and form of our extinct Carolina parakeet have also been received from the Zoological Park. These are the green leek, the black-tailed parrot, and the Alexandra parrot, the last a very delicately colored species with a rose-colored throat. All three are birds of restricted range and increasing rarity.

We wish the bird lovers of Australia all success in their efforts to preserve these charming members of their avifauna, but it is almost too much to hope that all of them can be saved.—W. DEW. M.

THE VANISHING HEATH HEN

The American Museum has recently received a most welcome gift of five heath hens from Mr. Arthur Sharp of Boston, Massachusetts, which were shot on Martha's Vineyard about 1896. The heath hen is a very close relative of the prairie chicken of the West, and both are noted for the booming noise made by inflated air sacs, the erectile ear tufts, and the antics or dances of the males during the mating season. These character-

istics are well-shown in the habitat group of the prairie chicken on the third floor of the Museum.

The heath hen formerly occupied a limited range in the Middle Atlantic States, and was found only in extensive pine and scrub-oak barrens. Absolutely sedentary in habits, it was mercilessly shot for food throughout the year, cultivation and settlement still further restricting its range. It became extinct in Connecticut about 1832, on Long Island about 1840, and in New Jersey about 1870 at the latest. The only place where it did survive was on Martha's Vineyard, where thousands of acres of ideal country afforded it ample protection even when hunted. But cats and foxes introduced on the island became an increasing handicap, and severe forest fires on several occasions decimated its numbers. Since 1906 when only 27 birds were found living, the state of Massachusetts has made earnest efforts to preserve the remnants. The birds increased, until at times there were between 800 and 2000. In the last few years there has been a rapid and alarming decrease. Severe forest fires, the depredations of cats and other vermin, and an apparent excess of males seem to be the chief causes which threaten another North American game bird with extinction. Mr. Keniston, the caretaker of the reservation, recently counted 8 in a careful census, and Doctor Gross, who has been carrying on an extensive investigation for two years, could only find 3 in May of this year.

As it has long been impossible to acquire specimens, it is to be hoped that the example which Mr. Sharp has set be followed, and that all specimens in private hands will be bequeathed to museums at a proper and convenient time, for permanent preservation.—L. G.

THE PACIFIC GULL

A single genus of the gull family, *Gabianus*, was lacking until recently from the collection of the American Museum. It includes but one species, *G. pacificus*, inhabiting the eastern and southwestern coasts of Australia, and remarkable for the extreme depth of the beak. The tail, even in the fully adult plumage, is always crossed by a black band. Though not particularly rare about Australia, the Pacific Gull is represented by only six or seven adult specimens in all the museums of the United States and Canada. Ours is the gift of the

New York Zoological Society, in whose gardens it was for a time exhibited alive.

THE DWIGHT COLLECTION OF CENTRAL AMERICAN BIRDS

The American Museum has long possessed collections from Panama and Nicaragua which represent their bird life with a fair degree of adequacy. The now historic explorations of McLeannan in the Canal Zone went in large part to George N. Lawrence, and this institution inherited many of the types of new species discovered by this energetic engineer. This basic collection has since been supplemented by the work of J. H. Batty in Chiriqui, and notably the large and valuable collection made by Messrs. Anthony, Ball, and Richardson in the mountains of Darien. In the last year more than 2000 skins have been received from eastern Chiriqui and Veraguas through the Griscom Panama Expedition, and Mr. Rex R. Benson will remain in the field until all the gaps in the Pacific slope of western Panama from the Costa Rica boundary to the Canal Zone have been filled. Our collections from Nicaragua are the largest and the most comprehensive in the world.

Guatemala and Costa Rica were, however, the areas which received the most attention at the hands of the early explorers and ornithologists, largely because of their greater accessibility and more healthful climates. Eighty years ago a flourishing industry in trade-skins sprang up in Guatemala, and thousands of skins reached the museums of Europe. This auspicious beginning was supplemented by the expeditions of Osbert Salvin, the great British ornithologist, to such good effect that more than 600 species were recorded from this little country by 1860. Curiously enough exploration ceased at this time. No adequate biological reconnaissance of this country, with its excessively diversified topography, has ever been made, and no adequate representation of its bird life exists in America. Costa Rica, on the other hand, is the most thoroughly explored section of Central America and very fine collections exist in this country.

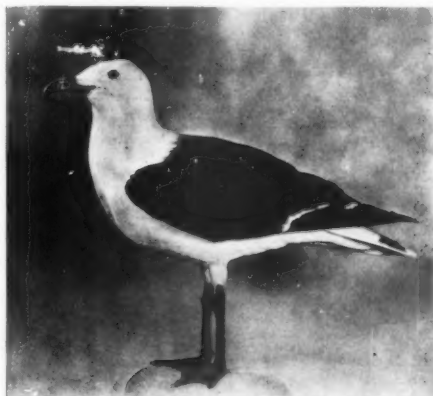
The result has naturally been that Guatemala and Costa Rica are the type localities for numerous genera, species, and subspecies of birds. No collection from any other part of Central America can be critically determined, unless adequate series from these two countries are available. The American Mu-

seum has a mere handful of old trade-skins from Guatemala, and a few hundred skins from Costa Rica received in exchange.

It is with the greatest pleasure, therefore, that we can report that Dr. J. Dwight has made every effort to remedy this situation. One of the most energetic of American collectors, Mr. Austin Paul Smith, has been in residence in Costa Rica for the past five years and has visited every section of the country. No less than 4000 skins are now in the Dwight Collection, and more than 90 per cent of the resident species recorded from the country are represented by perfectly prepared specimens. Not only has Mr. Smith found many of the rarest and least known birds, but he has discovered several new species and forms previously overlooked, and has added others to the avifauna of the country. Two at least are additions to the fauna of Central America.

Doctor Dwight has had much greater difficulties in acquiring collections from Guatemala. Destructive earthquakes and revolutions have rendered conditions so unsettled that collecting has until recently been financially impossible. However, Mr. A. W. Anthony has been working for the past year chiefly in western Guatemala, and Mr. Smith made a small collection prior to the earthquake. Nearly 2000 specimens have been

acquired to date. These are all from historic collecting localities, but several forms are new to Guatemala, and at least three subspecies are undescribed, a graphic illustration of the need for careful and systematic exploration



Pacific gull

These collections are on deposit in the American Museum and thanks to the generous policy of their owner, are available to the staff of the bird department in their research work.

Departmental Activities

I. ROUTINE WORK

A NEVER-ENDING demand upon the time of the department is made by the care of our collections. Specimens when received must be entered in our catalogues, identified, and placed where they belong in our collections in order that they may become an available part of our working equipment. Furthermore, constant care must be exercised to guard the collections from the attack of insect pests. It is a pleasure to report that all but the most recently received specimens have been catalogued and that our collections are free from insects.

The acquisition of new specimens from our collectors, by purchase, or through exchange, implies a wide correspondence. Collectors are dependent upon us for supplies, equipment, and funds, and look to us for instructions concerning their routes, the localities we wish explored, the birds we especially desire. We

must supply them with credentials and secure for them permission of the authorities to pursue their calling, all of which implies contacts apparently far removed from pure ornithology.

It is also part of our routine work to act as an ornithological Bureau of Information, and in this capacity we respond to requests of a surprisingly varied nature. Strange birds "not in any bird book" are to be identified, artists to be supplied with material, customs authorities and game wardens to be advised concerning the applicability of the laws designed to prohibit the importation of foreign birds and protect native ones. As these lines are being written calls come for the loan of a penguin to pose in a Barrie motion picture scenario, and for a game cock to be used in designing a heraldic device, and they will doubtless be followed by others equally unexpected.

In short, there appears to be no limit to man's relations with birds or to the variety of ways in which the Museum aids in defining and establishing them—all of which means a heavy correspondence and a long list of callers.

II. EXHIBITIONS

Lack of space has for some time prevented us from making important additions to our exhibition collections. Individual specimens, as mentioned above, have been added to the systematic series, but with the opening of the new wing an opportunity is afforded for the development of plans long held in abeyance.

First among these is the arrangement of the main bird hall for the display of birds in flight. Here we propose to place species which are usually seen on the wing, like wild ducks and geese, the condor, albatross, frigate-bird, and eagle, showing characteristic poses, from the top to the bottom of the wing stroke, and the "formations" of those species that travel in flocks. It is hoped that this exhibit will be opened to the public in November.

Material has been collected for the first of a series of habitat groups designed to illustrate the major faunal regions of the world, and their installation will begin as soon as cases are supplied.

III. RESEARCH WORK

Each member of our scientific staff is engaged upon some definite piece of research work to which he devotes all the time not required by other departmental duties. Doctor Murphy, who has recently returned from an expedition to the coasts of Peru and Ecuador to make additional field studies for his monograph on the marine birds of South America, has now resumed his study of the Sanford-Brewster Collection on which this monograph is based.

Mr. Miller has collaborated with Mr. Griscom in the study of Nicaraguan birds, and with Doctor Alexander Wetmore in preparing a new classification of the birds of North America for use in the revised edition of the American Ornithologists' Union's *Check-List*. In his own special field he has made an exhaustive examination of wing-ptyriosis and various other features of the external anatomy of all the specimens of birds received in the flesh from the New York Zoological Society and other sources. He has also examined certain features of the internal anatomy of this material, particularly the

viscera, carotids, ambiens muscle, and deep-seated plantar tendons.

Mr. Griscom (with the collaboration of Mr. Miller) has completed the systematic and faunal portion of their work on the distribution of bird life in Nicaragua from which region they record 610 species of birds. The introduction to this work remains to be written. He has also prepared a *Check-List of the Birds of Panama* as a basis for an extensive report on the distribution of bird life in that country. With Doctor Dwight he has prepared a report on certain of the Costa Rican birds which the former has received from Austin Paul Smith, a collector resident in that country.

Doctor Chapin is putting the final touches on his report on the Birds of Belgian Congo. His field work began in the Congo sixteen years ago, and since the latter part of 1920 he has been busied principally with the preparation of this report. At that time our Congo collections of birds had been identified provisionally, but these identifications were verified and corrected during a visit to a number of European museums in 1921. Meanwhile, a systematic search of ornithological literature was carried on, and all references to specimens secured in or close to the borders of the Belgian Congo were noted on small sheets of paper of uniform size and arranged as a card-index. Since it was proposed to treat the species of the whole Belgian Colony, this index would furnish distributional data to supplement that secured by the Congo Expedition.

From this index, moreover, in 1922, a preliminary list of the birds of the Congo was drawn up, with their ranges in that area briefly stated with reference to a key map. It was found that some 1050 species could be listed, whereas in Reichenow's *Vögel Afrikas*, 1900-1905, only 610 species were reported from the same area. The American Museum Congo Expedition alone in traversing the colony from Banana to Aba secured 640 species of birds.

Since the preparation of the list the status of each species and race has been re-investigated, and brief systematic remarks prepared for the report, as well as a statement of range, notes on life histories, haunts, and nesting and food whenever available. This will make it of use as a book of reference on African ornithology, while dealing mainly with Congo ornithology. Many maps and illustrations have been prepared to explain the next.

Doctor Chapman, continuing his studies of the origin and distribution of Andean bird life, has completed his review of the more than 1450 species of birds found in Ecuador, of which all but 30 odd are contained in our collections, and is now preparing an introduction to this work which promises to exceed in size his *Bulletin* on the "Distribution of Bird Life in Colombia."

Meanwhile in the intervals not devoted to editorial labors in connection with this issue of NATURAL HISTORY a brief report is being prepared on the Tate Venezuelan Collection.

Doctor Dwight, research associate, is revising proof of his monograph of the gulls of the world, and Mrs. Naumburg, research assistant, is bringing to completion her report (in collaboration with George K. Cherrie) on the birds of Matto Grosso, Brazil.

THE STUDIES OF PROFESSOR SUSHKIN

During the past spring and summer, Professor Peter Sushkin, of the Academy of Sciences at Leningrad, made an extended visit to the United States with his wife to study our museum methods and collections, especially palaeontological and ornithological. After a little more than two months spent at Harvard University and the Museum of Comparative Zoology, Professor and Mrs. Sushkin came to the American Museum, and for seven weeks divided their time mainly between the Permian fossils and the bird collection.

The finches and their allies have interested Professor Sushkin particularly of late, and at the Museum of Comparative Zoology he found alcoholic material and skeletons of *Geospiza* and other American genera which had not been available in Europe. At the American Museum he continued these investigations, paying special attention to a number of African weaver-birds brought home in fluid by our Congo Expedition. The results have been embodied in a valuable paper for the American Museum *Notitates* entitled "Con-

tributions to the Anatomy and Classification of the Weaver-birds."

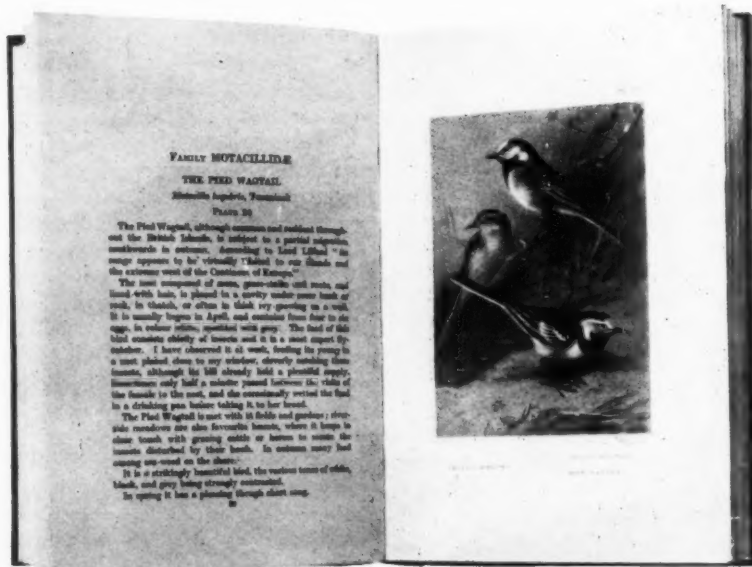
One of the surprising conclusions reached by Professor Sushkin concerns the all-too-familiar house sparrow, which he finds from the structure of the palate and other characters to belong not with the true finches in the Fringillidae, where it has almost always been placed, but in the Old World family Ploceidae, which includes the weaver-birds, widow-birds, and waxbills. This would suggest a true relationship between the house sparrow and the social weaver or republican finch of southwestern Africa, famous for its enormous colonial nest, looking like a small haystack draped over some thorn tree in the dry, open plains. The latter bird, *Philetaurus socius*, has been shifted back and forth between the Fringillidae and Ploceidae, but its anatomy has not yet been carefully investigated.

In the department of vertebrate palaeontology Professor Sushkin's attention was devoted especially to the material from the Permian of Texas, and to the latest methods of cleaning and mounting fossil specimens in general. Besides having charge of the bird collections of the Russian Academy of Sciences, he is also curator of Permian fossils.

After leaving New York on April 25, Professor Sushkin attended the meeting of the National Academy of Sciences in Washington, where he read two papers on his palaeontological work and on the past distribution of life in Asia. Further studies were pursued in the National Museum, followed by visits to the museums of Pittsburgh and Chicago, and a trip to other spots of special interest in the West. Professor Sushkin is one of the foremost authorities on the distribution of birds in Asia, and it is expected that his elaborate work on the avifauna of the Altai Mountains will be published by the Boston Society of Natural History. He has also promised us a paper on the birds of Central Asia for inclusion with the reports of the Third Asiatic Expedition.



BIRDS IN BOOKS



From Thorburn's *British Birds*
(Reduced)

Catalogue of Birds of the Americas. By Charles B. Cory, late Curator of Zoology, revised and continued by Charles E. Hellmayr, Associate Curator of Birds. Part III. Pteroptochidae; Conopophagidae; Formicariidae. Publication No. 223; Field Museum of Natural History. Svo. 369 pages.

The late Charles B. Cory planned his *Catalogue of Birds of the Americas* with characteristic breadth of vision. Unfortunately he lived to see only two parts of it appear, but had he known that he must resign in favor of another, he would have been the first to approve of the selection of Dr. C. E. Hellmayr to complete the task which he had begun.

Called from his post in the Zoological Museum in Munich to become associate curator of birds in the Field Museum, Dr. Hellmayr at once took up Cory's work where he had left it, and the first result of his labors is seen in Part III of this important undertaking. It deals with the tropical families of Tapacolas (Pteroptochidae), gnat eaters (Conopophag-

idae), and ant birds (Formicariidae). This volume we are told in the introduction by W. H. Osgood, curator of zoology in the Field Museum, was left by Mr. Cory "in an advanced stage of preparation" but has been revised and augmented by the junior author.

The work is in the highest degree authoritative; indeed it is the first adequate treatment of the groups concerned which has ever appeared. In effect, Doctor Hellmayr for a quarter of a century has been preparing for the opportunity which the Field Museum has offered him in its invitation to continue Cory's work. More familiar than any other person with European bird collections, he has long devoted himself to the study of the birds of tropical America. Had he known of the task he was to be called on to perform, he could not have prepared himself for it more thoroughly. The science of ornithology, therefore, is to be congratulated on having the results of these years of study made accessible, and we look forward impatiently to the appearance of succeeding parts of this helpful publication.—F. M. C.

Zoologica, VI, No. 1, 1925, 1-193 pages; illustrated with line cuts and half-tones.

"Studies of a Tropical Jungle." By William Beebe.

In a recent number of *Zoologica*, the scientific journal of the New York Zoological Society, Mr. Beebe devotes two hundred pages of text to a discussion of the fauna of one-quarter of a square mile of tropical jungle at Kartabo, British Guiana. The area is that surrounding the Tropical Research Station, between the Mazaruni and Cuyuni rivers. It has been subdivided into more than a thousand one-hundred foot squares, any one of which can be readily located through reference to a key chart.

The paper opens with an unequal but informing account of the geography, meteorology, geology, physiography, and flora of the region, and closes with a brief historical sketch. The remainder, 150 pages or thereabouts, is devoted to the animal life of which the birds, numbering 464 species, "in visual, color and vocal dominance . . . stand first, yielding only to fish and amphibians [among vertebrates] in point of number of individuals. . . . Insects are the only other organisms which stand comparison in point of general dominance." Mr. Beebe tells us that the birds make up 56 per cent. of all vertebrates at Kartabo, and that, furthermore, the variety of bird life in the quarter-mile square comprises 64 per cent. of the total avifauna of British Guiana.

Representatives of all of the twelve phyla of animal organisms, except echinoderms, occur in the small, segregated area. The abundance of life in the jungle and in the small open spaces or along the water courses is indicated by the author's "forty-five minute list." Within such a brief period, he tells us, no less than 256 species and 536 individual creatures came under his notice.

In a swift and necessarily superficial manner, Mr. Beebe catalogues the various classes, orders, and subgroups of the Kartabo microcosm, beginning with the Protozoa and proceeding dauntlessly to the highest of the vertebrates. The catalogue, in spite of its cursory nature, is very much of a *tour de force*, giving an impressive picture of the indescribable wealth and luxuriance of tropical life. Nor does the author fail to fill his terse paragraphs with ecological notes of great interest. His tabulations of stomach contents, and reference to the prey and the devourers of

many species, mark the beginning of exact work which can profitably be carried on indefinitely.

The account of the birds includes a "Christmas Census" of the Kartabo region in accordance with the popular custom which originated in the United States through the magazine *Bird-Love*. One hundred and sixteen species were observed, of which all but twenty-one are permanent residents of the district. "A vivid idea of the relative abundance of species of birds in the tropics as compared with the temperate zones is shown by the avifauna of New York State and that of the quarter of a square mile of jungle about Kartabo. The former, in actual area, is 180,000 times as large as our tropical field of research." Excluding introduced, accidental, and exterminated species, however, the bird life of the two regions sums up as follows:

	New York	Kartabo
Total species	330	464
Migrants	262	21

Mr. Beebe's paper is an original and comprehensive study, which makes an excellent basis for the detailed monographs of the various groups of organisms promised by the author.—R.C.M.

A Natural History of the Ducks. By Dr. John C. Phillips. Longmans, Green & Co., Vol. I, 1923; Vol. II, 1924 (two more volumes to follow).

Zoologists of today are asking themselves how their successors of a few decades hence will find it possible to keep abreast of what has been published in their chosen fields. The literature of ornithology in particular widens and deepens unceasingly. It is especially fortunate that in addition to yearly indexes like the *Zoological Record* there appear from time to time general reviews of the faunas of particular regions, and of certain large groups of birds throughout the world.

Thus the naturalist seeking information on a given family of birds has often been able to refer to one of the classical "monographs" by various authors, treating for example of the pheasants, kingfishers, birds of prey, and many others. But as ornithological exploration and classification advances, the older monographs grow more or less incomplete, and new ones become a necessity. These standard monographs have varied in their mode of treatment. At first they laid particular stress on figuring as many species as pos-

sible in color, and added only a brief explanatory text—often all that was known. In more recent works there has been more and more to include in the letterpress.

Few families of birds exceed in their many-sided interest for mankind that of the ducks and geese. Doctor Phillips has wisely chosen to call his great work a "Natural History," so much is there to tell of the members of the Anatidæ. Though monographic in nature, these volumes not only present the best to be had in artistic portrayal of a majority of the species, but they contain a summary almost encyclopedic of all that is known concerning the distribution, behavior, food, and nesting of each species. The original sources are scrupulously stated, in case the reader wishes to investigate still further. The domestication and hybridization of many species is likewise touched upon, this being a field where Doctor Phillips has done original work.

The first volume treats of the subfamilies Plectropterinae, Dendrocygninae, and a section of the Anatinae—the true sheldrakes, and Egyptian and Orinoco "geese." Current usage is followed in part in grouping among the Plectropterinae such very different birds as the spur-wings, comb-ducks, Hartlaub's "teal," and "pygmy geese"; but the wood and mandarin ducks have been excluded. The tree-ducks or Dendrocygninae, on the other hand, are a more natural assembly.

Volume Two is devoted to the single genus *Anas*, here including typical pond-ducks which Sharpe's *Hand-List* divided in ten distinct genera. Doctor Phillips' opinion is founded upon an intimate acquaintance with the live birds, in captivity as well as in the wild state, their complex resemblances, and their well-known tendency to interbreed. The thoroughness of treatment of each species might be illustrated in the case of any of our American examples, the black duck for instance, to which are devoted a little more than ten quarto pages, a distributional map, and duotone plate. Besides a full description and a list of scientific and vernacular names, there are detailed statements of distribution and migration and elaborate notes on the food. The sportsman will even find an appraisal of the species as adapted to the human palate. The geographic races are discussed more briefly; and the treatment by species or binomial forms, rather than to give excessive importance to trinomials, has much to commend it in a book of this wide scope. In most

families of birds a list of subspecies goes out of date rather rapidly, whereas the species of ducks as here given will prove relatively stable.

Equally full accounts are given of many exotic ducks, just as far as present knowledge permits. The majority of plates are in color; and the distributional maps, though drawn perhaps a little larger than necessary, cover every species. The appearance of Volume Three during the present year is awaited with great interest. With the exception of two frontispieces by Frank W. Benson, showing the pintail and mallard in their haunts, the plates are by Louis Agassiz Fuertes and Allan Brooks, with one also by Henrik Grönvold, all bird artists *hors concours*. It is perhaps to be regretted that some of the plates in half-tone, like that of the black duck, could not also have been reproduced in full color. Duck-lovers for years to come will be deeply grateful to Doctor Phillips for this exhaustive biography.—J.P.C.

A Monograph of the Birds of Prey (Order Accipitres). By H. Kirke Swann. London, Weldon & Wesley, Ltd. Parts I–III, November 25, 1924, January 31, 1925, May 30, 1925. Pp. i–xi, 1–196, five unnumbered plates per part, some colored.

Mr. Swann has long been known as a student of the birds of prey, and his recently published synopsis is the first general review of the group in forty years. The present elaborate and handsome monograph may consequently be regarded as the final product of his studies. The first three parts, which have appeared with commendable promptness, give a very fair idea of the caliber of the work. Primarily a technical and systematic account, it has the usual full descriptions of characters and an elaborate synonymy, but the geographical distribution and ranges of many forms are regrettably general. The systematic classification of the Accipitres has long needed very careful study and revision, which is still awaiting the accumulation of adequate skeletal material in the hands of a competent anatomist. The classification adopted in the present work is a modification of the old one, based largely on external characters. The author is conservative in his treatment of the higher groups, dividing the order into three families: the vultures, the unique secretary bird of Africa, and the hawks and eagles proper. The last family is by all means

the largest, and is further subdivided into eight subfamilies, the characters of which are often slight and tend to overlap. Mr. Swann is gratifyingly conservative in his conception of the genus, but is something of a "splitter" in recognizing slight variations of size or color as subspecies. In many cases, however, this serves a useful purpose and emphasizes the need of further specimens to obtain a correct idea of racial as distinguished from individual variation. Hawks have many complicated changes of plumage and color phases, and as they are large birds and it takes a long time to prepare specimens, collectors have never cared to devote much time to accumulating series. This has handicapped all students of the group, through no fault of their own.

While Mr. Swann does not in this work claim to advance our knowledge of the Accipitres to any material extent, he is to be congratulated on having compiled such information as is now available, and he is presenting it in what gives every indication of being one of the handsomest and most accurately printed monographs which have appeared in recent years.—L. G.

British Birds, written and illustrated by Archibald Thorburn with 192 plates in color. In four volumes. Vol. I. New edition. Longmans, Green and Company. London, New York, Toronto, 1925. 8vo. xii, 176 pages, 48 plates figuring 108 species.

While the biographer would find it difficult to produce a book on British birds containing much that was new, they will doubtless always afford fresh material for the artist. The text of the present work, for example, is essentially that of the same author's four-volume royal quarto of 1915-16. Indeed it is issued as a new edition of that sumptuous publication. The plates, however, are wholly new and this fact in connection with the book's much smaller size and lower cost makes it a quite different work.

As an artist Mr. Thorburn, we believe, is generally conceded first place among British bird painters, but as a painter of birds' portraits his position as a leader may perhaps be questioned. He possesses in an exceptional degree the gift that many bird painters lack of placing his bird in nature. In composition, tone, choice of accessories, and general treatment his pictures possess rare charm. When, however, it comes to details of anatomy, pose, and physiognomy, he is not always so success-

ful. We trust that the remaining three volumes will appear shortly, for the book will be a useful one. It should be in demand among American bird lovers who propose to visit great Britain or the continent. The publishers would, however, have more nearly supplied the wants of the traveling bird student if, instead of reducing the original quarto to an octavo, they had made it a duodecimo and in two volumes instead of four. It could have been done.—F.M.C.

Zoological Results of the Swedish Expedition to Central Africa, 1921, Birds. By N. Gyldenstolpe, Kungl. Svenska Vetenskapakademiens Handlingar, (3) I, No. 4, 1924, pp. 1-326.

Prince Wilhelm of Sweden, on his expedition to the Kivu district in quest of big game and gorillas, was accompanied by Count Nils Gyldenstolpe as zoölogist. The excellent reports on the birds and mammals of Siam previously prepared by Count Gyldenstolpe gave proof of the care and thoroughness of his work, and the present account of the birds he collected in Africa is a most detailed and useful commentary on the avifauna of the Kivu and adjacent regions.

Spending nine months in eastern equatorial Africa, the Swedish Expedition made a special investigation of the now-famous Birunga volcanoes and the eastern border of the Congo forest near the Semliki River and Irumu. The varied zoological collections brought back to the Royal Natural History Museum of Stockholm included nearly 1700 birds of about 400 different species. The new forms discovered by the Expedition and here listed include eight subspecies and one distinct species, the latter a small flycatcher, *Cryptolopha wilhelmi*, from the alpine region of the Kivu volcanoes. It is allied to *C. alpina* of Mt. Ruwenzori, and Count Gyldenstolpe secured many other species on the higher slopes of the volcanoes which illustrate the relations between the mountain-dwelling birds of the two ranges. On Mt. Karisimbi, for example, he discovered the male of *Cryptospiza shelleyi*, a weaver-finch previously known from a single female specimen taken on Ruwenzori.

Such additional knowledge is often just as valuable as the finding of a new geographic race. Of several birds previously known only from single specimens brought home by the American Museum Congo Expedition, such as *Chatura melanopygia* (a large swift), *Batis ituriensis* (a flycatcher), and *Malimbus flavipes*

(a weaver) Count Gyldenstolpe obtained additional material that confirms the original descriptions. The difficulty of finding a new species of bird in the Congo at the present time is a reliable indication of how well the birds of the region are beginning to be known. Since the year 1890, when Emin Pasha and Doctor Stuhlmann inaugurated the zoological investigation of the Ruwenzori region, remarkable progress has been made both in the political administration and in the scientific exploration of the region.

Now that the avifauna is so well known as regards the species, it is time to undertake more detailed studies of the life histories, food, and determining factors of distribution. Much of this will be found in Count Gyldenstolpe's report. Its introduction is of special interest, and contains notes on the vegetation of the Birunga volcanoes, with special reference to the distribution of birds, and is illustrated with landscape photographs. Throughout the systematic part the author presents his notes as to the haunts and behavior of the birds, factors of great weight in their distribution. In many ways his treatment is a model. Colors of the soft parts, which disappear in dried skins, are carefully described, and the principal dimensions of every specimen are given. The fullness and accuracy of the bibliographic references are gratifying, and make this a reference book of the highest utility to fellow-workers on African birds. It enables one to get at the main facts of geographic variation in any given species with the least possible delay; and this is a valuable help at the present time, when the systematic worker loses more time over the minutiae of trinomial forms than with many a more important question of classification or relationship among birds. The well-chosen color plates and excellent map form a fitting close to such a useful and well-planned report. —J.P.C.

University of Iowa Studies, Fiji-New Zealand Expedition, 1924. By C. C. Nutting and Collaborators.

This profusely illustrated and rather unusual volume of 369 pages is the fourth narrative in book form relating to expeditions sent out in the interests of natural science from the State University of Iowa. The series originated in the author's mind after reading such older classic works as Darwin's *Voyage of the "Beagle."* Professor Nutting explains further

that in the recent past "much of interest has been lost to the general public by the failure of those in charge of scientific explorations . . . to recognize the claims of the general public to a more popular account of such work than is given in the series of technical reports customarily issued."

The field party was limited to six professional naturalists representing the departments of geology, botany, and zoology of the university. They left Iowa in May, 1922, and subsequently spent about one month at the Fiji Islands and five weeks in New Zealand. The nineteen chapters of the book cover not only the narrative of the journey by Professor Nutting, but also special accounts of the fauna of various restricted regions, as well as chapters relating to the history, customs, and ethnic characters of the Fijians and Maoris, by the same author. Dr. Dayton Stoner contributes chapters on ornithological and entomological experiences in Fiji and New Zealand, respectively, while similar accounts relating to the geological subjects are given by Dr. A. O. Thomas, and two chapters on botany by Dr. R. B. Wylie.

Doctor Stoner's ornithological notes are in the nature of general impressions rather than detailed studies. Much of the text is reprinted from articles which the author has already published elsewhere. His remarks on species introduced into Fiji, such as the minah, are interesting and pertinent. He greatly over-emphasizes the scarcity of marine birds in the Fiji region, however, and in attempting to be accurate beyond his actual data he mis-identifies the local tropic bird, for *Phaethon æthereus* is a species which has never been recorded in that part of the Pacific.

Professor Nutting's sections of the book include an excellent naturalist's record of field work on Makuluva, an island a few miles from Suva, in which he not only describes the south Pacific reef fauna, but also makes illuminating comparisons based upon his former experiences with conditions in the West Indies and elsewhere. In other parts of the work he gives us good first-hand accounts of such historic creatures as *Periophthalmus*, the "tree-climbing fish," and of the primitive *Sphenodon* or tuatara. Four of the latter reptiles, the gift of the New Zealand Government, were brought back alive to the University of Iowa. Professor Nutting, moreover, has much of interest to say regarding the

excellent traits of physique and character which belong to the Fijian aborigines, and he describes with a sympathy, which his readers must also feel, their inevitable losing struggle for existence against the rapidly increasing Hindus who were first introduced into the islands as farm laborers. In discussing the inhabitants of the Fiji Islands, however, the author falls into the common error of confusing them with Polynesians. In spite of the undoubted racial mixture in the south Pacific, the Fijians must certainly be termed Melanesians and should not be loosely associated with Tongans or Tahitians when characteristics of

the "South Sea Islanders" are under discussion.

In spite of the highly personal, not to say trivial, nature of much of Professor Nutting's narrative, most readers who are interested in the present status of south Pacific geography and civilization will find the work entertaining and valuable, while travelers will heartily agree with the author's caustic thrusts at certain aggravating phases of the United States passport and customs regulations and at the appalling bureaucracy of some of our own representatives in these services when compared with similar officers of other nationalities.—R.C.M.

The Ornithological Magazines

THE appended notes on the contents of the more recent numbers of the leading ornithological magazines are presented not as a critical review but as a means of conveying information regarding the character, function, and place of issue of these publications; in short, as an annotated directory of bird journals. It will be observed that all the magazines here noted are the organs of societies.

The Ibis: A Quarterly Journal of Ornithology.

Edited by William Lutley Sclater. Published by the British Ornithologists' Union. Wheldon and Wesley, Ltd., 2-4 Arthur Street, London. Twelfth Series, Vol. I; Nos. 1-3, 1925.

The Ibis, founded in 1859, is the meeting place of British ornithologists from every corner of the world. The first two issues for 1925, for example, contain articles on the birds of Arabia, Majorca, Sierra Leone, British Sudan, the Cameroon, Himalaya, Indo-China, Palestine, Macedonia, Spain, and British Guiana. Most of these articles are regional lists of the species observed, with notes on their numbers, distribution, and habits. There are also papers on avian anatomy, classification, and distribution, reviews, letters, and general notes and news.

The illustrations include maps, half-tones, and excellent colored plates.

Journal für Ornithologie, published quarterly by the German Ornithological Society, and edited by Dr. Erwin Stresemann, Berlin.

The *J. f. O.*, as it is familiarly called, was founded in 1853 by Dr. Jean Cabanis, and edited for many years by Professor Anton Reichenow. Doctor Stresemann is the third of its editors, all of whom have been curators

of birds in the Berlin University Museum.

Contributions to this journal come from all parts of the world, but more space is usually devoted to the birds of Europe and Africa than to those of other continents. The questions discussed are exceedingly varied in scope, and by no means mainly systematic. In the first two numbers for 1925 we find descriptions of new birds from Brazil, as well as accounts of the use of birds in the medical practice of the ancients, the interrelation of avifauna and vegetation in southern China, experiments on the sense of taste in birds, the structure of metallic feathers, a bibliography of ornithology in Saxony, and reviews of African glossy starlings and several birds of prey in Europe.

The interesting proceedings of the German Ornithological Society are also included, but reviews of ornithological literature are now printed in the *Ornithologische Monatsberichte*, also edited by Dr. Stresemann. The *Monatsberichte* thus serves as a supplement to *J. f. O.*, with shorter articles on technical subjects and many notes on the occurrence of birds in Europe.

The Auk: A Quarterly Journal of Ornithology.

Edited by Witmer Stone; Published by the American Ornithologists' Union. Lancaster, Pa. Vol. XLII, Nos. 1-3, 1925.

While the members of the British Ornithologists' Union are as widely distributed as

the British Empire itself, the members of the American Ornithologists' Union are for the greater part resident in North America. It follows, therefore, that the contents of *The Auk*, organ of the A. O. U., relate largely to American birds. There is thus a greater community of interests among contributors to *The Auk*, than among contributors to *The Ibis*, with a corresponding increase in the number of notes of more or less local importance covering a more restricted area and with a greater number of observers. *The Auk* has largely passed the faunal-list stage of bird study and its articles are now chiefly biographic or subjective in character.

There is an admirable department of "Recent Literature," and others for "Correspondence" and "Notes and News." The illustrations are half-tones from photographs. There are no colored plates.

The Emu: Quarterly Organ of the Royal Australasian Ornithologists' Union, 376 Flinders Street, Melbourne, Australia.

The Emu always brings with it a feeling of wide spaces and good fellowship. Bird study in Australia is conducted in the field rather than in the laboratory, and a volume of *The Emu* leads us over much little-known territory where we meet strange birds in strange places.

The next annual Congress of the American Ornithologists' Union will be held within the walls of the American Museum, and after adjournment there will be some one-day excursions to neighboring bird resorts. But an annual Congress of the Royal Australasian Ornithologists' Union is accompanied by a "camp-out" which evidently rises above the excursion stage and affords rare opportunities for coöperative observation.

The first two numbers of *The Emu* for 1925 (Vol. XXIV, Nos. 3 and 4) contain an annotated list of the birds observed in connection with the Union's Congress for 1924. It includes 182 species of which 42 were found nesting. This Congress was held in Rockhampton, Queensland, whither most of the members traveled from Brisbane as guests of the mayor and were later addressed by the governor and variously entertained,—all circumstances quite as foreign to an A.O.U. Congress as a "camp-out!"

Aside from a detailed report of the Congress there are numbers of excellent papers in these two issues, of which the most notable is the

presidential address of Dr. J. A. Leach on "The Naming of Australian Birds."

The Condor: a Bi-monthly Magazine of Western Ornithology. Edited by Joseph Grinnell. Published by the Cooper Ornithological Club, Pasadena, Cal. Vol. XXVII, 1925; Nos. 1-3.

The Condor is to the Cooper Club what *The Auk* is to the A. O. U., but, covering a smaller area and reporting the proceedings of an organization which meets monthly instead of yearly, it has closer relations with its clientele.

Living in one of the most interesting ornithological regions in the world, the members of the Cooper Club have taken advantage of their opportunities, and the pages of *The Condor* bear witness to their industry and the keenness of their observations.

There are departments for bird banders, notes from field and study, reviews, and editorial comment. The illustrations are half-tones from photographs, which, like the magazine, are exceptionally well printed.

The Wilson Bulletin. A Quarterly Magazine Devoted to the Study of Birds in the Field. Edited by T. C. Stephens. Published by the Wilson Ornithological Club at Sioux City, Iowa, Vol. XXXVII, Nos. 1 and 2.

The Wilson Ornithological Club brings together the bird students of the Mississippi Valley, and in the publication of its official organ has the coöperation of state bird clubs in Nebraska, Iowa, Kentucky, and Tennessee. As its subtitle indicates, it is a magazine for the student of birds in nature, and its contents deal therefore with the living bird. Bird banding is a phase of bird study in which many of its members are interested.

After serving as editor for thirty-six years, Professor Lynds Jones was succeeded by the present editor in March of this year.

Bird-Lore. Official Organ of the Audubon Societies. Edited by Frank M. Chapman. D. Appleton & Co.

Four numbers of the twenty-seventh volume of this bimonthly have appeared during the year. The January-February issue is chiefly devoted to the results of the Christmas Bird Census which this magazine has conducted for a quarter of a century. Twenty-seven observers contributed to the census of 1900; more than 400 took part in that of 1924, a

measure of the growth of our interest in birds during the last twenty-five years.

Under "The Seasons," edited by John T. Nichols, each number of *Bird-Lore* contains reports from a corps of observers throughout the country on recent events in their part of the bird world, making a symposium of current interest and permanent reference value. There are scores of general articles on

birds in nature, minor notes, colored plates by Fuertes and Brooks, and many photographs.

As editor of the school department, Dr. Arthur A. Allen contributes to each number a fully illustrated article designed to be helpful to teachers, and in the Audubon department, Dr. T. Gilbert Pearson, president of the National Association of Audubon Societies, presents the news relative to bird conservation.



UPLAND PLOVER

With wings aloft when alighting; showing the beautiful pattern of their under surface. Photographed by Dr. Frank N. Wilson, Belleville, Mich. From *Bird-Lore* for October

FROM OTHER MUSEUMS



ALEXANDER WETMORE

Assistant Secretary of the Smithsonian Institution, in charge of the United States National Museum

The appointment of Dr. Alexander Wetmore as assistant secretary of the Smithsonian Institution was a logical event in the history of a career which has been marked by advance as rapid as it is deserved.

Entering the service of the Biological Survey on part time in 1910, while still a student in the University of Kansas, Doctor Wetmore, on graduating in 1911, joined the Survey's staff.

During the succeeding thirteen years he was its representative on a number of important scientific missions of widely varying character. These have carried him to Porto Rico, southern South America, parts of the United States, Hawaii and other Pacific islands.

Between times Doctor Wetmore has found, or probably it would be more exact to say,

has made, opportunity to do a large amount of original research. A thorough workman, he has also the ability to produce without loss of time, and he already has to his credit a surprising number of authoritative publications.

Doctor Wetmore was elected a Fellow of the American Ornithologists' Union in 1919 and a vice-president in 1923. In November, 1924, he was appointed director of the National Zoological Park, succeeding the late N. Hollister, and was soon thereafter advanced to the post he now holds. It is to be hoped that his new duties will leave him time for further studies in a field which he has occupied with so much credit to himself and profit to the science of ornithology.

Introductory Note

IN ORDER to give some conception of current ornithological activities in the museums of this country which have devoted especial attention to birds, we have asked some of our colleagues to tell us of their work in field, study, and exhibition hall, and of their plans and policies.

This necessarily brief review far from completes the picture of what is being done to advance our knowledge of birds. To do this would require a description of the manifold functions of the Biological Survey, of the National Association of Audubon Societies with those of its state and local allies, of the work of many of the smaller museums, which often reach their public more effectively than the larger ones (witness the Museum of Birdcraft Sanctuary), and of the opportunities offered students by educational institutions, like Cornell University, which have regular courses in ornithology.

UNITED STATES NATIONAL MUSEUM

FOREMOST among the special projects in or connected with the Division of Birds is the work by Robert Ridgway, known as Bulletin 50, or "Birds of North and Middle America," of which eight volumes have been published to date. When the work was first projected as a definite task, in 1894, it was thought that eight volumes would suffice, but this limit was later extended to ten, with a possible supplementary volume. The eight volumes that have been published contain 6623 pages and 222 plates. Mr. Ridgway is now assembling data for the final volumes.

"Life Histories of North American Birds," by Arthur Cleveland Bent, bears the same relation to biographic, that Mr. Ridgway's volumes do to systematic ornithology. Of this work five parts have appeared, each as a separate Bulletin of the National Museum. Mr. Bent has prosecuted this work with characteristic energy, with the result that another volume covering herons and allied birds is about ready for the press, and notes have been assembled for succeeding parts.

Another project under way for many years is one that deals with the generic names of birds, showing their variations (emendations), giving their types, family relationships, and other information. The author, Dr. C. W. Richmond, has thus far issued three supplements to Waterhouse's *Index Generum Avium*, while a fourth is nearly ready for the press. He has also spent much time in preparing a card catalogue of specific names of birds, giving certain useful information about them (author, place of publication, date, type locality, and similar data), but it is not expected these data will be published, useful though they are to those who prosecute their studies in the office of the Division of Birds.

Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution, in charge of

the National Museum, has in progress a series of studies on the anatomy of birds, and has done considerable work on fossil birds, chiefly of North America. He is engaged at present with Miocene material belonging to the American Museum of Natural History, and Miocene and Eocene specimens from the Carnegie Museum, in addition to fossils and cave material that have come recently to the National Museum.

With Dr. Casey A. Wood, he has completed a paper on a collection of birds from the Fiji Islands, obtained by the last-named author. He has now in press a report on the collections made by him in Argentina and neighboring states, under the auspices of the Biological Survey, and has in contemplation a report on the material obtained by him under the same auspices on Laysan, Midway, Wake, and other islands in the Pacific, and a revised account of the birds of Porto Rico to appear in the series sponsored by the New York Academy of Sciences.

Mr. J. H. Riley has been occupied with the study of important collections received in recent years from China, in part through co-operation with the National Geographic Society and in part through the activities of the Rev. D. C. Graham. Mr. Riley has practically completed an account of a fine collection made in Yunnan by J. F. Rock, traveling for the National Geographic Society, and is at work also on the series brought to the Museum by F. R. Wulsin, secured in southern China, under the same auspices.

Dr. H. C. Oberholser, of the Biological Survey, has for years worked over the collections made by Doctor Abbott in the Malayan region and islands, and has reported upon several of the collections. He has given preliminary descriptions of many new species and forms from the same collections, and is still engaged in these studies.

Doctor C. W. Richmod and B. H. Swales, honorary assistant curator of the Division of Birds, have in preparation a bulletin listing the type specimens of birds in the United States National Museum, as well as one on the birds of Haiti and Santo Domingo, but work on these subjects has been delayed for various causes. It is hoped that a more decided advance on these projects may be made in the near future.

Among other activities of the Division of Birds may be mentioned assistance given to the American Ornithologists' Union in the preparation of its proposed new *Check-List of North American Birds*, and of the latest "Index" to *The Auk*, now in manuscript. The foreign references of the forthcoming "Index" to *The Auk* for the period from 1910 to 1920 are now being revised in the Division of Birds, and Doctor Wetmore has coöperated with Mr. W. DeW. Miller of the American Museum in revising the classification of birds for the new A. O. U. *Check-List*.

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

IN DEVELOPING the bird collection the attempt is being made to secure representatives of all the genera of the world and the more distinctive species in each, especially those which have served as the types of genera. The Academy's collection having always been a very representative one, this policy is simply carrying on that of the past.

At the same time efforts are being made to strengthen the representation of the birds of countries where the collection has been weak, and collectors are procuring material for us in parts of China, Siam, and in Bolivia. Wherever possible, too, juvenal plumages of foreign birds are being procured to aid in the study of plumage development and relationship.

While the collection of North American birds is reasonably complete, efforts are being made to obtain better specimens and fuller representations of the larger land and water birds. Through the liberality of certain members of the Academy, it has been possible to secure during the past winter a fine series of the ducks of the Atlantic Coast which have been specially prepared to ensure their preservation in the future.

The local collection has been made readily accessible to students, with the result that many private collections made in past years

by members of the Delaware Valley Ornithological Club have been presented and added to it. As individual collecting of local birds is now but seldom carried on, it seems desirable to gather together all such material that is in existence and place it where its preservation will be assured and where it will be accessible to all who are qualified to make use of it.

The D. V. O. C. holds its meetings at the Academy through the courtesy of the institution, and does much to stimulate ornithological interest, while the Pennsylvania Audubon Society and the Wissahickon Bird Club, interested more especially in the conservation of bird life, also make the Academy their headquarters.

Besides the extensive local collection of birds on permanent exhibition in the Museum, a seasonal collection of birds mounted in small boxes is exhibited and changed from time to time as the season advances, to show just what birds may be found in the vicinity of Philadelphia at any time.

MUSEUM OF COMPARATIVE ZOOLOGY

Thanks to Mr. John E. Thayer, the department of birds is now represented in the field by W. W. Brown in southern and southwestern Vera Cruz, where, among other interesting species, he has secured the rare wren *Hylorchilus*.

Harvard University is participating in the Mjöberg Expedition to the mountains of Central Borneo.

Recent expeditions include those of Dr. John C. Phillips to Uganda and the Eastern Congo; J. L. Peters to Martinique, St. Vincent, and St. Lucia; W. S. Brooks to Cape Colony, Natal, Transvaal, Rhodesia, and the Southwest Protectorate, and Outram Bangs to England, France, and Germany. In addition to the specimens resulting from these expeditions the department has received a collection of about 1000 birds from northern Argentina, including both the high Andean flamingos, the rare snipe, *Plegadis*, and finch, *Idiospar*, the Swann Collection of Accipitres, and representative series taken by G. H. H. Tate in northeastern Venezuela and by H. Friedman in north and south Central Africa.

Mr. J. E. Thayer has presented the Museum with numerous birds from northern Mexico, and Dr. Thomas Barbour, who is especially interested in our exchanges, has filled important gaps in the collection from

time to time. In the laboratory, Peters' work on a card catalogue of the birds in the Museum is progressing satisfactorily. It contains all the forms recognized up to 1925 and indicates those represented in the Museum. Using Sharpe's *Handlist* as a basis, it appears that of the 2647 genera of recent birds recognized by him, but 182 are lacking in the collection. Of the 18,938 species recognized by the same authority the Museum has about 10,000. The collection contains about 150,000 skins and probably more than 1000 types.

The third volume of Doctor Phillips' monograph of the ducks of the world (see review, p. 509) has just appeared and proof-reading is well advanced on the fourth. Doctor Phillips is now engaged on a new work on extinct and disappearing birds.

Mr. T. E. Penard and Outram Bangs have nearly completed their life of Lafresnaye and account of his collection as well as of the Lesson, Boissoneau, Guerin, and other types contained therein.

A change in the arrangement of the teaching laboratories will greatly increase the amount of space available for the bird department. Of special importance in this connection is a course in ornithology by Dr. G. M. Allen, the first ever given at Harvard. For this course, which was most successful and popular, full credit is allowed for the degrees of A.B. or S.B.

CARNEGIE MUSEUM

With the receipt of 4522 birds from the Rio Solimões, Brazil, the Carnegie Museum has the largest and most complete collection of Amazonian birds in existence. The new forms in this addition to the Carnegie collection are in process of being described; the collection as a whole is being worked up in connection with the general collection.

During the year critical determinations of the specimens representing six families have been completed. A paper on the tropical American species of the goldfinches of the genus *Spinus* has been completed.

The compilation of data for a proposed work on the birds of Western Pennsylvania has been prosecuted steadily by Miss Ruth Trimble, whose services have been available through the generosity of the local Audubon Society.

The most notable addition to the exhibitions is a group showing the blue goose at James Bay, the gift of John B. Semple.

THE CLEVELAND MUSEUM OF NATURAL HISTORY

THE South Atlantic Expedition of the Cleveland Museum of Natural History was undertaken in cooperation with the American Museum of Natural History. Its purpose is to study the oceanic islands of the Atlantic as the Whitney South Sea Expedition is studying those of the Pacific. The expedition sailed from New London in November, 1923, in the three-masted schooner "Blossom," 109 feet over all, under the leadership of George Finlay Simmons.

The first work of the expedition was an extensive study of the bird life of the Cape Verde Islands off the west coast of Africa. Practically all of these islands were thoroughly studied, and although the common European migrants were neglected in favor of local species, the collection includes more different forms of birds than were previously known from the group.

From the Cape Verde Islands the "Blossom" sailed to the African mainland at Dakar, Senegal. In but few places is there a better opportunity of studying the life of the mainland in comparison with that of an adjacent oceanic island group than in Senegal. Here the "Blossom" obtained collections that make an excellent beginning of the Cleveland Museum's African fauna, and afford a fine foundation for later study of the relationships of the life of the mainland to that of the Cape Verde Islands.

Since the "Blossom" left Dakar, she has been working south of the equator, and only the collections and reports forwarded from Rio Janeiro are available at this time. The most interesting of these pertain to the "Blossom's" visit to the Martin Vas Rocks and the volcanic island of Trinidad, seven hundred miles east of Rio Janeiro. The Martin Vas Rocks had probably never been landed upon before, yet the Expedition collected two species of spider, an interesting problem in geographic distribution. Another puzzle in distribution is the presence of earthworms on these islands. Important bird collections were made on Trinidad and specimens were secured there of the descendants of the goats landed by Captain Edmund Halley more than two hundred years ago.

It is expected that the "Blossom" will report soon at the Island of Ascension, which is a cable station, and will reach a home port in the autumn of 1925.

FIELD MUSEUM OF NATURAL HISTORY

FOLLOWING the completion of the third part of the "Catalogue of Birds of the Americas" (see review, p. 508) Dr. C. E. Hellmayr, associate curator of birds, at once began work on Part IV and in this connection has spent the summer studying in European museums.

Aside from Hellmayr's work, the most important matters in the Division of Birds are the splendid growth of our ornithological library and the progress of Mr. H. B. Conover's collection. Under the patronage of Mr. E. E. Ayer, the first president of the Museum and still an active trustee, a very large number of scarce and desirable ornithological books have been purchased during the past two years. J. T. Zimmer has made a very fine bibliographic catalogue of the library which will be published in the near future.

Mr. H. B. Conover's collection of the game birds of the world, which is deposited in a special room in the Museum, continues to grow. Mr. Conover employs collectors throughout the world, and at the present rate of progress should within a few years have the best collection of the families included in this country.

The oölogical collection has been advanced to the first rank through the receipt of the collection of Mr. R. M. Barnes, of Lacon, Illinois.

Plans for field work, in which special attention will be paid to birds, include an expedition to Brazil. It is hoped that George Cherrie's presence on the Roosevelt Expedition to Central Asia will result in a collection representing the bird life of the region visited.

COLORADO MUSEUM OF NATURAL HISTORY

THIS Museum is becoming widely known for its growing series of bird groups, planned and prepared under the direction of Director J. D. Figgins, who played so important a part in the production of the bird groups in the American Museum.

The earlier groups were made with the use of photographic transparencies as background, but with the completion of the Joseph M. Standley Wing to the Museum building, more elaborate habitat groups of birds were undertaken, these being largely confined to North American species not found in Colorado. Chief among these groups are the summer

birds of southwestern Louisiana, the water fowl wintering on the coast of the same region, the Bahama Island birds, a large group illustrative of the breeding birds of the Bear River Marshes, Utah, and numerous others of rare or extinct species. For the most part, however, this series of groups consists of Far North varieties, the large birds of the Arctic coast region of Alaska being especially well represented.

The Colorado Museum has used from three to thirty-eight species of birds in some of its habitat groups, and with the installation of like exhibits in the W. H. James Memorial Wing, to be devoted exclusively to South American subjects, the number will be greatly increased.

A party from the Colorado Museum is now at work in Argentina, Paraguay, and southern Brazil, collecting specimens and materials for the construction of habitat groups, some of which will be in excess of one hundred feet in length. An example of this plan of installation will be the birds of the upper Paraguay River. Accounts of naturalists who have visited that region, notably that of Colonel Theodore Roosevelt (in *Through the Brazilian Wilderness*) describe an enormous number and variety of species found in small areas. Any attempt adequately to illustrate scenes of that character necessitates a radical departure from hitherto recognized standards of group construction, and instead of utilizing several exhibits representing localized conditions of bird life, the entire length of the halls of the James Memorial Wing will be employed, in which a cross section of the greatest abundance of bird life can be shown. Obviously, then, the future development of habitat groups is limited only to the space available in the halls of a museum building.

CALIFORNIA ACADEMY OF SCIENCES

THE Academy is especially interested in the distribution of bird life in California and on the islands off the coast.

The Mexican government has not only greatly assisted our expeditions to certain of the islands off Lower California, but has even gone so far as to invite us to send representatives upon some of its own voyages of investigation. This courtesy has been reciprocated by the Academy, and Mexico has invariably been in turn invited to send representatives upon our own voyages to its territory. In this way a most friendly feeling

has been established, to the benefit of all concerned.

The most recent expedition of this sort has been one to the Revillagigedo and Tres Marias groups, which the Academy was enabled to undertake through the courtesy of Secretary of the Navy Wilbur, who placed at its disposal the mine sweeper "Ortalan" from mid-April until mid-June.

The bird department has been represented upon all of these expeditions, when specimens and data have been obtained which are to be worked over and incorporated into a proper report. Further work in this line is being planned for the near future and there is good reason to expect gratifying results.

MUSEUM OF VERTEBRATE ZOOLOGY, UNIVERSITY OF CALIFORNIA

THE Museum of Vertebrate Zoology was founded in 1908 by Miss Annie M. Alexander, and continuously from that time it has received from her a large part of its support. In its inception this museum was devoted primarily to the study of the animal life of western North America, especially that of California, and its activities have remained pretty closely within these limits.

Dr. Harold C. Bryant, economic ornithologist in the Museum, editor of *California Fish and Game*, and in charge of education, publicity, and research for the California State Fish and Game Commission, is mainly concerned in the educational aspects of ornithology. He conducts nature classes in the Extension courses offered by the University of California throughout the academic year. Nature guide service, begun in a modest way in Yosemite Valley several years ago in cooperation with the National Park Service, has grown to such proportions as to engross his entire time during the summer months, and to require the employment of several assistants during the present (1925) season. In this connection there has been developed a school

for the training of nature guides which is receiving marked support.

Mr. J. Eugene Law, curator in osteology, has devoted much time to the care and development of the osteological collections of the Museum. The series of bird species thus represented have been built up largely with regard to the needs of Dr. Loye Miller in the study of the fossil bird remains in the Rancho-la-Brea deposits and elsewhere in California.

Miss Margaret W. Wythe, assistant curator of birds, has been occupied, in collaboration with Doctor Grinnell, on an account of the birds of the San Francisco Bay region.

Dr. Joseph Grinnell, director of the Museum, is also professor in the department of zoology of the University, and in this capacity devotes considerable time during two courses in vertebrate zoology (general and economic) to class instruction in ornithology. Work in progress includes a cooperative study with Miss Wythe on the birds of the San Francisco Bay region, as already mentioned, and, during the past year, with the late Richard Hunt on the birds of Morro Bay, California. A rather extensive program for the study of the natural history of a cross section of the California Sierras in the Mount Lassen region is now being carried out by Doctor Grinnell and Mr. Dixon.

Miss Annie M. Alexander and Miss Louise Kellogg, though latterly more especially interested in palaeontological collecting, gather in a few birds as occasion permits. Last year their efforts resulted in a small collection of birds from Egypt, and in other years series from the Hawaiian Islands and from various localities in the deserts of the Southwest.

While the bird collection of the Museum pertains mostly to North America, and especially to the western parts thereof, small collections of exotic species have been acquired, for the most part, as gifts from various individuals.



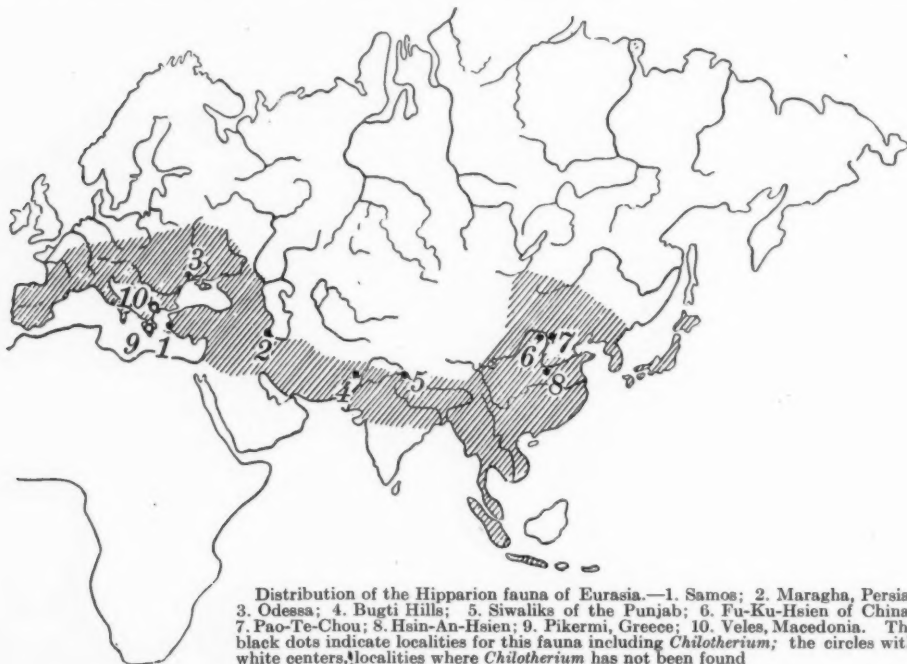
NOTES

EXTINCT ANIMALS

EXTINCT RHINOCEROSES OF NORTH CHINA.

—Dr. Torsten Ringström contributes to *Palæontologia Sinica*, published under the direction of V. K. Ting and W. H. Wong, of the Geological Survey of China, an invaluable memoir entitled "Nashörner der Hipparion-Fauna Nord-Chinas," in which appears a

American branch was given off, terminating in the American species, of which the most characteristic was *Teleoceras fossiger*, which swarmed in great numbers in the rivers and swamps of our western Pliocene deposits. This animal was protected by a sharp horn at the very tip of the nasals, to which the name *Teleoceras* refers. The Asiatic form *Chilo-*



geographic distribution map which is reproduced herewith. In this widespread life zone, indicated by shaded lines, a very similar fauna was distributed throughout Pliocene time, beginning with the lower Pliocene of Pikermi and of Samos and closing with the upper Pliocene, in which *Hipparion* entirely disappears not only in Asia but in North America. Extending from this broad and at the time fertile and hospitable life zone, were species of the short-limbed, low-bodied genus of rhinoceroses to which the author gives the name *Chiloterium*. This genus represents the Asiatic branch of the subfamily of the rhinoceroses known as *Teleocerinae*, which is represented in the corresponding period in North America by the genus *Teleoceras* of Hatcher. The author shows (p. 68) that from an unknown source in upper Oligocene time an

therium, on the other hand, entirely lacks the horn in both sexes. The nasals are horizontal; the inferior incisors are correspondingly enlarged for purposes of attack. The geographic distribution is from upper Miocene to lower Pliocene time in Eurasia. Of equally great interest in this valuable memoir is the recognition by the author of the ancestor of the giant single-horned Pleistocene rhinoceros described by Brandt a half century ago as *Elasmotherium*. The ancestry of this animal has long been in doubt; the author now discovers its ancestry in the genus *Sinotherium*, and places it in a separate family *Elasmotheriidae* (pp. 143–45). *Sinotherium* is distinguished from *Elasmotherium* by the relative simplicity of its grinding teeth and by the presence of one more premolar tooth. The upper jaw is greatly compressed. For the

same animal Killgus (p. 123) gives the name *Parelasmotherium*, and the bones of this animal were referred by Schlosser, 1903, to the genus *Hippopotamus*.

These two discoveries greatly enrich our knowledge of the ancestry and descent of the rhinoceroses in the Old World. Doctor Ringström accepts the phylogeny and classification of the rhinoceroses substantially as described by Professor Osborn in a recent number of *NATURAL HISTORY*.

Another important contribution to this series of memoirs on the Hipparion fauna of China is by Doctor Zdansky and deals with the Carnivora. It will be reviewed in a later issue of *NATURAL HISTORY*.—H. F. O.

HISTORY OF THE EARTH

"THE ENDLESS CAVERNS."—The forty-eight-page booklet on "The Endless Caverns of the Shenandoah Valley," by Associate Curator Reeds of the department of geology, should be of interest to every reader of *NATURAL HISTORY*. The booklet, which was published by the Evans-Brown Co., Inc., 150 Lafayette Street, New York, appeared in July after Doctor Reeds had visited these beautiful caverns in January and May of this year. Not only is the wonderful work of water above and below ground discussed, but special consideration is given to how caverns are excavated, what processes are at work, the circulation of air in caves, how secondary growths are formed in caverns, and what becomes of the water of caves and underground streams. The age of these spectacular caverns is considered in relation to four cycles of erosion which are well exhibited in the surface features of the region. The booklet is fully illustrated with photographs that have not been excelled in any other publication.

FISHES

THERE is no more fascinating department of study in the science of ichthyology than that which relates to the various extraordinary means adopted by fishes for the protection and hatching of their eggs and for the care of the young until they can fend for themselves. Among some sharks and rays and also among some few bony fishes, viviparity is practiced—the young are born alive. Other bony fishes like perch and bullheads make nests in the sand wherein the eggs are laid and guarded. Other fishes make birdlike nests of

sticks and weeds, or even of foam. Still other fishes take into their mouths the newly laid eggs and there incubate them, not only exercising parental care until the eggs are hatched but until the young are developed sufficiently to look out for themselves.

Still another class of ocean fishes lay their eggs in a gelatinous raft which floats about at the surface of the water until the eggs, under the warmth of the sun, hatch, and the fishlets break out of the band of jelly and begin a free life. It has long been known that the angler, "all-mouth," or goosefish of our northern waters, lays such an egg raft. Less well known to those who do not have at hand a knowledge of the literature of reproduction of fishes, is the fact that the Sargassum fish, which lives among the seaweed of that name, as it crawls among the weed extrudes a gelatinous raft of eggs, and this, intertwined in the weed, forms the so-called "nest" of this fish.

But now there comes the amazing news from the researches of Mr. C. Tate Regan, the distinguished ichthyologist of the British Museum, that among certain deep-sea angler fishes taken in the waters of the northern Atlantic and in the Gulf of Panama, the females are large and well developed, while the males are small, insignificant, and permanently attached to the females as parasites. In one case a female measured 1030 mm. in length, and the parasitic males 80 and 85 mm.; in another case the female was 1000 mm. in total length and the attached male 105 mm. over all.

These dwarf males are born as independent, free-swimming little fishes, but they later become permanently attached to the female. The jaws and lips of the male grasp a papilla of the skin of the female and in some unknown way become fused to the skin, forming a continuous tissue. This tissue is fibrous and highly vascular, and the blood vessels lead from one fish into the other—as Regan puts it: "It is impossible to say where one fish begins and the other ends." That is to say, there is in this case an absolute case of parasitism of the male fish on the female, in that all his food is carried through the blood vessels which are continuous from the female to him. This parasitism effectively provides a male at hand to fertilize the eggs when these are extruded by the female, and inevitably and effectively insures reproduction.—E. W. G.

NEW MEMBERS

SINCE the last issue of *NATURAL HISTORY*, the following persons have been elected members of the American Museum, making the total membership 8300:

Life Members: MESDAMES G. LISTER CARLISLE, JR., D. C. COOK, ANSON W. HARD; MESSRS. ARTHUR W. BUTLER, ALFRED J. CRANE, AND JOHN J. LICHTER.

Sustaining Members: MRS. H. A. MOORE; MISS ALETHEA SERPELL; MESSRS. CHARLES SUTHERLAND HAMNER, AND BERTRAND L. TAYLOR.

Annual Members: MESDAMES EMILY L. JONES, CLARENCE LOW, LOUISE M. PERRY, STANLEY RESOR; THE MISSES MARY TILSTON BRYCE, FLORENCE P. CLAYTON, ELISABETH MOREHOUSE SMITH; DOCTOR O. EASTLAND; THE HON. WILLIAM BATES GREENOUGH; MESSRS. LEONARD D. ADKINS, C. E. ALLEN, ROBERT CRABB, WILLIAM ELLIOTT, JR., ERNEST S. INGRAM, MILTON J. ISRAEL, JAY MADDEN, LEO H. MCCALL, WM. NESBIT, JOHN GILE PAUL, P. T. L. PUTNAM, EDWARD

J. REULBACH, HARRY S. TRULL, AND WILLIS B. WOOD.

Associate Members: MESDAMES R. B. ALVES, CLAYTON S. COLVIN, ALEXIS L. EHRLMAN, ALFRED EHRLMAN, GEORGE W. STRATTAN; THE MISSES FRANCES L. B. BUNYARD, FLORA C. LOW, MARIAN VAN BENTHUYSEN; DOCTORS M. H. EVERETT, HARRY S. LADD, L. H. PAMMEL, J. ROSS REED, ARTURO R. ROS, L. A. SCHROEDER, J. HOLBROOK SHAW, DERRICK T. VAIL, JR., HERBERT U. WILLIAMS; JUDGE HENRY A. MANDELL; MAJOR FRANK P. TEBBETTS; MESSRS. FRANK S. BADGER, R. F. BAKER, R. H. BULLEY, GEORGE CARY, JR., FREDERICK J. CHAMPION, E. BLOIS DU BOIS, FREDERICK S. FORD, JOHN B. FORD, JR., H. B. FORSTERER, S. H. HASTINGS, ARTHUR H. HOWELL, LUDWIG JAEGER, EDWARD DUDLEY JOHNSON, CLAUDE E. MARBLE, HARRY EAST MILLER, GEORGE T. ROPE, A. B. SMALL, CHARLES C. SMITH, ALBERT A. THOMPSON, LORING W. TURRELL, ISAAC O. UPHAM, C. H. WALDRON, WILLARD C. WHITING, ALBERT J. WINKLER, AND WENDELL P. WOODRING.

MAMMAL NUMBER

NOVEMBER-DECEMBER

The November-December issues of *Natural History* will be a "Mammal Number" and will be edited by Mr. H. E. Anthony, in charge of the department of mammals. This number will show the great diversity of interests which may attract the attention of one studying mammals.

Professor Henry Fairfield Osborn will contribute the leading article, on a subject of fascinating interest, "Mammals and Birds of the California Tar Pools." These pools of viscous tar trapped literally thousands of saber-toothed tigers, enormous lions, wolves, condors, and other creatures of a bygone era. Dr. J. Howard McGregor, research associate in human anatomy, will present some hitherto unpublished data on the greatest of the mammals, man himself. Doctor McGregor writes on the primitive man, *Pithecanthropus* of Java.

The editor has selected from the letters and diary of Martin Johnson a few of the more exciting episodes which make up the day's work of the Martin Johnson African Expedition. Accompanying these will be a pictorial section in duotone, showing photographs recently received from the field. Mr. Barnum Brown, associate curator of fossil reptiles, will tell of his experiences in an unfamiliar big-game country, Abyssinia, the one-time home of the Queen of Sheba.

Ernest Thompson Seton will contribute excerpts from his forthcoming second volume of *Lives*. This de luxe edition of animal biographies is the most complete and ambitious account of North American mammals ever undertaken. Volume one, just recently published, will be reviewed by the editor.

Mr. H. C. Raven, assistant curator of comparative and human anatomy, will review some recent work by Australian mammalogists, who have made some very important contributions to science. Mr. Ira A. Williams of Oregon will contribute an account of unusually fine beaver-dam construction, with excellent photographs. The editor, who has had considerable experience with bats, both in the field and in the laboratory, will bring together for this number some interesting facts concerning these small mammals. Finally, there will be included the latest reports from expeditions in the field, plans for important research work, and discussion of some of the problems connected with the study of mammals.

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